NCERA 13 Meeting Minutes 19 November, 2013
Des Moines, Iowa

The NCERA 13 Committee was held the day before the 43rd North Central Soil fertility Extension – Industry conference. Des Moines, IA Nov 19.

Minutes prepared by Dorivar Ruiz Diaz.
Meeting started on time

Present:

Dave Franzen– North Dakota State University
Antonio Mallarino- Iowa State University
Daniel Kaiser – University of Minnesota
Robert Florence – Kansas State University
Renuka Mathur– Iowa State University
Dorivar Ruiz Diaz – Kansas State University
Manjula Nathan – University of Missouri
Jon Dahl – Michigan State University
John Peters – University of Wisconsin-Madison
Carrie Laboski – University of Wisconsin-Madison
Howard Woodard – South Dakota University
Anthony Bly – South Dakota University

Not able to Attend
Tim Shaver – University of Nebraska-Lincoln
Ron Gelderman – South Dakota University
Brad Joern – Purdue University

No representative for University of Illinois and The Ohio State University

Meeting began at 1:00 p.m.

Meeting was called to order by Dan Kaiser.

Minutes from the previous meeting were approved.

Current officers and rotation schedule was reviewed. Since Illinois and Ohio don't have representatives the following in the sequence is Kansas.
Revised sequence for chair, based on two year term following the federal fiscal year (Oct.-Sept.) is as follows:

12-14 MN, 14-16 KS, 16-18 SD, 18-20 IA, 20-22 ND, 22-24 MO, 24-26 NE, 26-28 MI, 28-30 IN, 30-32 WI, 32-34 IL, 34-36 OH.

Current officers until 2014:
Chair: Dan Kaiser
Vice-chair: Dorivar Ruiz Diaz

Secretary: Ron Gelderman

Need to check with Ontario, to include in the list. Dan Kaiser will talk to Keith Reid, to check if he will join the group. A follow up will need to be made with Ron Gelderman regarding his future plans.

Also need to check with Ed on the name for the Ohio new person.

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

State Reports:

IOWA

1. Update for the ISU Soil and Plant Analysis Laboratory (SPAL) – Renuka Mathur
The following table summarizes the numbers and distribution of samples analyzed in January 2013 to October 2013.

Sample type	Research/State	Farm/lawn	Total	%
Soil	9672	3137	12809	48.5
Plant	2240	983	3223	12.2
Biochar	26		26	0.1
Slurry	1088		1088	4.1
Saturated media extract		14	14	0.1
Saturate paste		16	16	0.1
Limestone	276	10	286	1.1
Client "DIY"	802		802	3.0
TC/TN pre-weighed	4967		4967	18.8
Solutions	3160		3160	12.0
Compost		3	3	0.01
Total	22231	4163	26394	100

The following summarizes the developments in the lab from January 2013 to October 2013:

1. There has been a steady increase in the plant tissue samples submitted to the lab since previous years.
2. Evaluated the testing methods for Biochar analysis.
3. Upgraded our website and implemented new test prices.
4. Currently in the process of preparing analysis protocol in the lab to offer moist K test as routine test for growers in Spring 2014 and upgrading our existing report generating software to include the new moist soil K test interpretations and recommendations.
5. We are in the process of hiring a full-time analyst position in the lab.

2. Research/Extension Activities - Antonio Mallarino
The main fertility activity related to soil-testing in Iowa has been the update of Iowa interpretations and recommendations for P, K, and lime in Extension publication PM 1688. The most significant changes were to eliminate consideration of subsoil P and K for interpretations, include interpretations for the moist test for K (field-moist or slurry), changes to soil-test interpretations for K using dried soil samples (to suggest higher K levels), adjustments to crop nutrient concentrations (reduced for grain crops) and default yields (increased for mots grain crops) needed to estimate nutrient removal, indicate more clearly the P and K recommendations for the two-year corn-soybean rotation, 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.

The College of Ag, extension, and the agronomy department continue struggling with budget issues, and none of several soils positions lost due to retirements in the last two years has been filled (including a fertility teaching position). A postdoc continues teaching the graduate soil fertility course, and Dr. Renuka Mathur (laboratory Director) has been requested to teach the laboratory section of the undergraduate soil fertility course. Applied soil-testing related fertility research continues emphasizing field calibration of several micronutrients for corn and soybean, potassium soil-test calibration in relation to soil mineralogy and hydrology, the late-spring soil test for corn in conjunction with other N research, and validation of the Iowa P Index including soil P testing used in its context.

KANSAS

Services: The Kansas State Soil Testing Lab currently offers soil, plant, water, and lime analysis. Many soil tests are for farmers and gardeners curious about their soil fertility and any fertilizer recommendations. Plant analysis for nitrates is commonly run for farmers and veterinary clinics. Most plant analysis work is performed for private and university researchers. Lime analysis are run for farmers and quarries around Kansas.

Funding: The lab is a 100% fee supported activity, with the exception of salary of the faculty member assigned to the project (Dave Mengel, 20% time assigned) and a portion of the salary of a Research Assistant (Robert Florence, 0.8 time).

Personnel: lab is currently staffed by a faculty member who directs the lab (Dave Mengel). Dr. Mengel has recently started phased retirement and upon retirement, Dr. Dorivar Ruiz-Diaz will take over as director. We have three full time analyst, one each dedicated to farmers soil (Lynn), researchers soil (Jake), and plant analysis (Kathy). We recently hired a lab assistant scientist to support the analyst in soil and plant preparation (Sharon). We also have a part time office administrator (Melissa). Four to five undergraduates also gain experience by working in the lab. A part time research assistant (Robert) answers farmers and researchers questions, checks fertilizer recommendations, as well as works on research projects in the lab.

Research projects: We are continuing sensor based research on corn and sorghum. We are in the second year of looking at direct P applications to soybeans on soils ranging in soil test P values. We have wrapped up our switch from Walkley-Black to LOI and began using LOI on July1, 2013. Future research on quick soil test methods for lead and other heavy metals is on the horizon as more homeowners and gardeners request their soil be tested for lead. A possible examination of multiple buffer pH lime recommendations and their comparison on various Kansas soils may be performed.

Equipment upgrades:
We bought a soil pH robot from Skalar early this year.
We also bought a new plant digestion block from Seal Analytical a couple months ago.

MICHIGAN

The reorganization of the Extension service has hurt the lab in number of soil tests analyzed, but the increased testing of research samples has more than offset this loss. The lab tested 10,130 grower/homeowner samples this past year with 3165 of those being the self mailers for homeowners. The self mailer portion increased by 30% from the previous year. Research soil tests also increased near 30%

to 2990 samples for regular tests. A large golf course characterization study contributed 650 samples for particle size analysis and sand sieve analysis during an otherwise slow period in February and March. Pre-sidedress nitrate tests stayed near constant at 280 samples. 9300 nitrate extracts for research samples were analyzed by our Lachat system.
Departmental news: Doo-Hong Min (Extension Forage Specialist) left the department in April for a position at Kansas State University. Extension positions within the department are getting more difficult to maintain as there doesn't seem to be much support from Extension for funding. FTE's in Extension within the department have been cut in half the last 10 years. There are currently 2 new positions that are nearing the interview stage, a Fungal Biology position and a Soil Biologist position.

MINNESOTA

The number of soil samples submitted to the University of Minnesota soil testing laboratory has remained steady for the last three years but is slightly down from five years ago. The numbers likely will improved with the shift in Management of the lab. Most of the samples submitted to the lab are non-farm related. Brian Barber is the current director and has been looking at ways to expand on lab services. Through funds received from the experiment station and department of Soil, Water, and Climate the lab as able to purchase a new Lachat and manifolds and a Novoware Microwave Digester. The lab also has received funding from the Minnesota Soybean Research and Promotion council to expand their offerings into quality analysis with the purchase of an HPLC analyzer for use in analyzing sugars and amino acids. They also have been looking into expanding into bacterial source tracing but will likely hold off at this point and have been actively seeking funds for a GC-MS and CNS analyzer. The number of samples run through private labs has been increasing but the exact numbers analyzed are unknown. There have been no major changes into the tests recommended for analyzing routine soil samples in commodity crop fields in Minnesota. Two current and on-going research projects are studying soil test correlations for the Bray-P1, Olsen, and Mehlich-3 tests for P and the ammonium acetate and Mehlich-3 tests for K. Currently the data does not support use of the Mehlich-3 for P so the test will not be recommended for use on routine samples in the state. Additional research is on-going on testing soils on a field moist basis for potassium.

<u>Other discussions:</u>
Brian Barber, new soil test director is working on QC, with good improvements in recent months. The STL cut from 4 to 2 full-time staff and most samples are from research. Most samples in the state goes to commercial labs (hard to compete with them). The lab will stay around but likely with more focus on internal samples.
There is some money coming for equipment, this may result in more automation.
The STL is moving into nutritional test, pesticide testing, bacterial source tracing to expand revenue.
Fabian Fernadez is the new soil fertility specialist and focus on N, there is also a new microbiologist. And will hire a new position to focus on bioremediation. Current open position at Lumberton MN, cropping systems, or related area (open for now). Hiring irrigation specialist 100% extension –non tenure.
Several nutrient management faculties due to funding from tax revenue (heavy focus on nutrients in MN)

MISSOURI

Chancellor Brady Deaton retired from services effective Nov 15th after a very successful career at MU. Currently search is underway for a new Chancellor for University of Missouri. Vice Provost for Research Brian Foster also announced his retirement. So University is in the process of filling his position. State funding for the University had an additional cut making the budget situation tight. The emphasis is becoming more on generating funds through grants and fee generation.

The Division of Plant Sciences was able to get two faculty positions filled in 2013. Asst. Professor of Forage Physiology (teaching and research) position Harley Naumann was hired at Columbia campus.

Maureen Jones was hired for the Entomology Research faculty position at the Delta Research Center. The weed scientist position at the Delta Research Center was changed to a Research Associate position and James Heiser was hired to fill this vacancy. The division currently has three positions open; two Viticulture faculty research and extension positions, and a Plant Diagnostic Clinic Director/Extension Associate position at Columbia campus. The budget situation remains the same.

The cool and wet conditions that prevailed in spring delayed planting of corn and soybeans. It was followed by drought in July and August. Harvesting was delayed and it was reflected reduction in number of soil samples coming to the lab during the fall 2013 season.

The MU soil and plant testing labs at Columbia campus and Delta Center analyzed a total of 37,706 soil samples, 2250 special soil tests, 6601 plant, 1451 water, 52 greenhouse media, 104 compost, 223 manure and 451 environmental tests. Both labs together analyzed a total of 48,335 samples last year. A web based soil test database and recommendation program is under development and is currently behind schedule in getting completed. MU soil testing labs continues to function as totally self-supporting labs based solely on fee generation, and operates successfully in black. We had visiting scientists and students going through training in soil testing methods, lab instrumentation, interpretations and recommendations.

I am continuing to work with IPNI on building a national database to improve nutrient removal estimates. John Lory received large funding to work on developing an improved P Index for Missouri jointly with adjacent states. Peter scarf is working on a multi-state funded grant on climate change research. A soil quality lab was established by Dave Hammer as added service to the soil characterization lab with NRCS funding. There seems to be more and more emphasis on soil quality by NRCS. Research on the use of cover crops for row crops is underway in Missouri.

Other discussions:
Growing season was late in most of the state with late harvest, so this also affected the number of samples in the lab.
Currently in the process of revising recommendations; a soil fertility working group is working on this. Target pH may need to be lower. Variable rate would be a good option. The current philosophy is maintenance + build.
There is significant amount of work on use of cover crops. Other areas of work include P and K test with farmers (Peter Scharf), preliminary results suggest some high P and K subsoil levels.
Rescue N application work also continues. Current N recommendations are based on SOM and crop removal, the rescue application approach involve reference strip and make side-dress applications.
Continue collecting data for IPNI project, total samples (good for some states and not good for some), need to continue adding more data.

NORTH DAKOTA

The North Dakota State University Soil Testing Laboratory operates under the direct supervision of Larry Swenson, who has managed the lab for many years. The number of farmer samples continues to decrease as the focus of the lab moves towards research support. The number of research samples has increased, particularly in the number of salt and sodium related samples.

Type of sample	Number of samples
Farmers	3,500
Research	7,943
Total	11,442

Other discussions:

There will be two extension soil specialist, Dave on soil fertility, and a new person working on salinity issues and Na.
Completing work on calibration (4 years) on N rate study, data includes NW MN. Recommendations focused on side dress, with increase in coulter applicators in recent years. Significant N loss in ND, so side-dress in the best option
In 2014 work will focus on developing new recommendations, this will be based on economic return model, web-base and paper using the sensors.
Work on K will also start summer of 2014.

SOUTH DAKOTA

Research Laboratory
The commercial lab services at SDSU were closed in 2011. Research laboratory activities have been able to support 1 full time technician. Most soil and plant samples received by the lab are from various funded soil fertility projects within the department.

Current soil fertility studies
1) Recalibration of corn nitrogen recommendations. Three year project began in 2013.
2) Recalibration of soybean P recommendations. Three year project began in 2013.
3) Updating soybean plant analysis interpretations. Three year project began in 2013.
4) N rate studies on Brassica Carinata (use oil for aviation fuel)
5) Agronomic and economic evaluation of using "N loss" products for SD
   - NBPT
   - Instinct
   - ESN
6) Field testing of products for Mosaic, Winfield, West Central, Loveland and Ag BioTech Inc.

Personell
Hired Anthony Bly as an Extension Soils Field Specialist – Sept 2013
Hired Nathan Mueller (K.State) as East River Ext. Agronomist – Oct 2012
Hired Chris Graham (Cornell) as West River Ext. Agronomist – Sept. 2013
Both Nathan and Chris were trained in Soil Fertility
Hired Sandeep Kumar (Ohio State) in soil physics research and teaching – Aug 2012
Ron Gelderman will retire in June 2014

Crops
The season began with dry soils but ample spring rains filled the profiles for most of state. Cool spring temps delayed growth of row crops. Warm, dry conditions persisted in August and September. Corn yields averaged about 145 bu/a for the state – above average.

<u>Other discussions:</u>
The STL transitioned from commercial to only research a couple of years ago. This transition is completed, and all samples from farmers go to commercial labs now.
Large amounts of tissue sampling by industry, and very intensive. They develop they own interpretations, no input from university. However, tissue analysis was relatively low in 2013 due to weather conditions. Despite no commercial portion of the STL, some farmers are still going to university for recommendations (is a need). Groups like Winfield are provided results to farmers with their tools (web-based).
Much discussion on tissue test use, factors affecting concentrations, stress, day of time etc….
Other issues with extension's role with some of these issues.

WISCONSIN

Following a very dry growing season in 2012, the 2013 season got off to a very slow start. Temperatures were below normal and rainfall was much above normal in most of the state, which resulted in very late planting of corn and soybeans. The central and northern areas of the state were most affected with corn and soybeans planted well into June and even early July in some areas. The soil testing volume was far below normal for WDATCP certified soil testing laboratories. Winterkill of alfalfa was also very widespread leading to a second year of forage supply shortage overall in the state. A very late killing frost helped extend the growing season, which was important due to the late planting of grain crops.

The University of Wisconsin-Madison continues to operate two soil-testing laboratories: the Soil and Forage Analysis Laboratory in Marshfield and the Soil and Plant Analysis Laboratory in Madison. During the past twenty months there has been an ongoing review of the laboratories initiated by the dean's office. The review committee has provided a report to the administration but no decisions or recommendations have come out of this process as of this time. The new Wisconsin soil test recommendation guidelines were in place for the 2013 growing season and the latest version of the interactive software SnapPlus2 is being released which will fully incorporate these changes.

Birl Lowery has stepped down as associate dean and will be retiring soon. Larry Bundy, retired research and extension soil scientist passed away on July 8, 2013.

Other discussions:
Wet spring and late planting with late harvest. Very few soil testing in much of the state. New recommendations and software in place since 2013.
Discussion on the use of subsoil nutrient values: Subsoil P and K data for Wisconsin seems to come from survey in the late 50s.
New recommendations: recommendations stay with 150 -200 ppm for dry soil test K.
Removal value for corn P2O5 is 0.32 (adjusted to moisture). Removal for alfalfa was also adjusted. These are lower nutrient concentrations compared to the past, but the defund yield is increased to 180 bu (state average + 5 bu).
Much discussion on subsoil classification Carrie discussed the origin of Wisconsin's classification.
Some soils in MN with low surface K and no response to K fertilizer, so very high subsoil K?
Cases of 40-45 ppm K in WI with very little increase in yield. Contributions from residue leaching can increase 15 ppm in IA.

Old Business

a) Invitation to private lab rep will be only for the workshop.

   Next workshop: is scheduled for Feb 24-26, 2015. Agenda for workshop is from noon Feb 25- to - noon Feb 26. Committee meeting will be Feb. 24 2015.

   Location: Iowa City – Clarion. - Wisconsin will check availability

   International soil and plan analysis symposia will be in Hawaii (Jan 26-30 2015)

b) Regional P publication (Mallarino): rough draft at this point, will share draft soon.

   P-chapter (Mallarino); working and ready to send to Manjula for review.

Sub-Committee Reports:

a) Education: Peters

Conference in Feb 2015. He will start planning and provide details by October 2014.

b) Publications

Sulfur chapter – draft by Franzen. Methods paper, out to the group and need feedback at this point. A group from the committee will read before the end of the year (Dan Kaiser, Manjula, MN lab director, Renuka).

Sulfur circular companion – Franzen send out a rough draft already: focus on test considerations/limitations from field work.

Micronutrient chapter (Kaiser): Manjula has a comparison between DTPA and Mehlich, she found good correlation for Zn but not good for Fe and Cu. Mallarino is also finding similar results: good for Zn and poor for Mn and Fe, and Cu.

Discussion on the issue that commercial labs are doing both DTPA and Mehlich, some labs are doing a conversion.

Recent studies show no response to micros so there is no good "correlation data". But there is relation data between methods.

Much discussion on critical values and the value of the number regardless of the method. In many cases finding low Zn fields is difficult (history of applications). Some common fertilizers include Zn as default application.

Discussion on the value of some micros test, (similar to S). Mn recommendations may be of value for Michigan.

The group think is ok to do Mehlich for Zn, not for other micros. Another issue is the use of ICP, that need research.

Correlation calibration chapter: need to revise, with new computer capabilities, and statistical tools. Also use new methods like strip trials, methods etc. to define "critical values".

Can be divided in smaller sub-chapters, since it may be a big topic for one person.

The group decided to wait and work on other priorities. Will discuss best approach for this once other priorities are completed.

OM chapter (Manjula): will include Robert's work and send out for review.

K chapter (comment for revision- Mallarino): may need revision on the description of method, so we use the same extracting solution for dry and moist test. It would be easy to fix in the website.

Boron chapter: will wait, no priority at this point.

c) Website – *Nathan*: materials in the site.

d) Seasonal soil test variability (focus on K, pH, and N- no issue for N). Franzen will continue work on seasonal K variability. Soil sampling and testing should be more frequent (less than 4 years). There is knowledge on the effects of unusual years. More "stable" timing may be spring (but inconvenient). Maybe suggest early summer (June?). Discussion on fall vs spring nitrate test. Will focus on K, pH and N (no issue for P).

Can be done a stand-alone review no enough information out to just link.
Franzen and Mallarino. Combination of review from Franzen and current work from Mallarino (residue nutrient release). Antonio can contribute with data evaluating Fall, spring and June.
Franzen will send a draft.

Tabled from previous meetings:

a- Strip trail will go with the correlation-calibration chapter.

b- Kaiser suggests some issues with tissue testing methods for S. The ICP seems to have issues, one of the main issues seems with grain with much lower than expected resulting in low removal numbers. There has been some work comparing methods.
Mallarino suggests that may also be the digestion method, so need to check that to evaluate the effect of ICP. So need to split the issue: digestion or determination? (CNS vs acid digestion).
Robert suggests that the correlation curve can be an issue. Robert also suggests that quality control can be an issue (checks?)

c- White paper for plant analysis. Mallarino suggested to wait for more data (2015?) there is need considering the interest from industry. The group suggests to wait.

d- Corn basal stalk N. There is data for a publication. Many issues with sampling and quality of samples. A publication may need to focus on methodology and sampling procedure. The main issue is trying to use that data to develop multiple interpretation "categories" when is probably good to provide only a "yes or no". For now wait and talk to Sawyer and others.

New business:

a- *In-house correlation (Mallarino).* One test based on another, may accumulate error, started with Bray1 and Mehlich. Currently some issues with reporting buffer pH when they are using various methods. Some cases Mehlich are used for micros and "transformed" and reported as DTPA. Should this be part of the certification? Solum is doing some of this but they provide correlation equations.
Data from Mallarino, show that back correlation to relative yield is not bad for P.
Some issues can be bigger, such as the buffer pH reports and micros. Estimation of buffer pH is a big issue in Wisconsin with one lab.
This issue may be at the state level, each state has different certification process and should be at that level.

b- *The Illinois K paper*, many e-mails regarding this issue. Many big flaws with the paper and will likely receive little attention in the future. There has been a similar issue with papers/information with erroneous information.

c- *Other:* Solvita test comparisons, there are some commercial labs doing. The test is been used as mineralization potential for N.
Some discussion about Adapt-N, and how this is working for some states; Antonio indicated that it would be good to see more cooperation from universities.
Discussion also about sharing data, and issues in some cases with how the data is used.

Next Meeting

Next is 24, 2015 Feb. and then Nov 2015.

The Clarion at Iowa City is holding the dates already

Future Direction and Initiatives:

Committee Assignments

Education: John Peters (ch), Antonio Mallarino. Moving forward.

Buffer pH John Peters (ch), Carrie Laboski, Dave Mengel, Manjula Nathan.Standby.

K Testing –Moist Soils: Soil exchange? Antonio Mallarino (ch), Carrie Laboski, R.Gelderman.

NAPT liaison: Brad Joern. Moving forward.

Sensing: Dave Mengel (ch), Manjula Nathan, Ron Gelderman, Jon Dahl. Stand by.

Website: Manjula Nathan (ch), Antonio Mallarino. Moving forward.

Manure: John Peters (ch). Stand by.

Publications: