

Minutes
Northeast Regional Committee on Soil Testing
NECC-1812
Thursday and Friday, October 11-12, 2018
Laurel Villa Inn, Milford, PA
Thursday, 10/11/18

Attendees: T. Morris (CT), D. Pettinelli (CT), T XXX (CT Tech), B. Hoskins (ME), Q, Kettering (NY), E Pena-Yewtukhiw (WV), M. Rutzke (NY), C White (PA), S Murphy (NJ), J Heckman (NJ), K Gartley (DE), A Shoher (DE), J Paller (DE), N Fiorellino (MD), and G Toor (MD)

Absent: J Spargo (PA). No attendees from MA, NH, RI or VT

The meeting was called to order at 1pm by Tom Morris and Dawn Pettinelli.

Tom and Dawn presented some housekeeping details, a round of introductions were made and plans for the group dinner were decided.

The group presented Tom Morris with a gift in honor of his impending retirement to thank him for all his contributions and years of service to the group.

The meeting rotation was reviewed. Delaware will organize the 2019 meeting and Maine will organize in 2020. Karen will act as secretary, take the minutes and collect the state reports.

The minutes from the 2017 were distributed and reviewed. A motion to accept the minutes was made Stephanie and seconded by Bruce and the vote to accept the minutes was unanimous.

As no administrative advisors were present, the discussion moved on to the first topic on the agenda.

Sulfur:

There is a lot of interest in NY. S deficiency has been confirmed in Alfalfa. New management tools are being developed. They are using a critical value of 0.25% in tissue in plants. Quirine's program has been looking at both field trials and at the various soil tests for S – both the extraction methods and the analytical techniques (ICP, FIA-color). The only extract that seemed to work well at predicting S deficiency was 0.01 M CaCl₂. The soil critical value appears to be about 8 ppm S. Testing was done with a regular 8" sample depth, but they believe that deeper would be better given subsoil reserves may exist but may be deeper than the traditional sampling depth.

Recommend management scheme for now – (1) Tissue test if deficiency is suspected or possible. (2) Soil test – with the caveat that current tests may not be the best predictors and that reserves may be deeper than the depth sampled. Mehlich 3 and Modified Morgan were unreliable at

predicting S deficiency. (3) Consider installing a test plot – add sulfur and evaluate yield. It doesn't have to be a large area, especially on forages, to be able to see the response, if deficiency is present. In some cases it may not be obvious until compared to the fertilized test plot. Evaluation of S sources shows that in most cases application of S fertilizer work one year but the fertilizer is gone by the next year. Fertilizer S is usually applied after 1st and 3rd cuttings. The effect of sulfur from manure applications seems to last longer – 3-4 years typically for Alfalfa.

Work with S in soybeans is starting. Two years so far but not looking to responsive to date. No work on corn yet.

Questions / status discussed by the group:

- Will Fall sampling work (e.g., since S leaches)? (Charlie) Unknown at this time.
- Will sap testing work for S? Any interest? Not yet (Mike).
- S deficiency is being found in Delaware. No recent or current work. We recommend using ammonium sulfate as one of the N sources as a preventative course
- PA is summarizing 3 years of work at the AASL – soils, tissue, also looking at SrCl₂ and M3 extraction for S. Also doing some work in soybeans.
- Possible interest in a multistate project on S.
- Possible source interactions

Regional S work in process: Masters student looking at S in vegetables – nothing available yet (NY). Ray Weil is looking at S effect on protein acid amino acids in soybeans, peas and beans (MD).

Land Grant University Survey – Soil Fertility Testing: Methods, Interpretation and Recommendations:

John Spargo is working with Deanna Osmond, Josh McGrath, Nathan Slayton and others to adapt and revise a survey that was originally sent to SERA-6 members about a year ago. The goal is to survey all the LGUs in the four regional research coordinating committees to collect information on current methods, critical soil test levels, recommendations and on-going soil test correlation work.

A copy of the preliminary survey will be sent to members by John and all members are asked to review in reference to questions that John will provide. The group asked John to forward the objectives for the project to the committee list-serv.

Committee comments from the discussion:

- Need to define critical values consistently across the country
- Where do recommendations go to 0
- Recommendations can be very restrictive to very generous, depending upon how critical values and interpretations are defined.

- “Soils do not respect state lines”. Neighboring states may be very different – creates credibility issues / confusion / difficulty for growers operating across state lines
- Also need to review current recommendations to decide if they are appropriate for today and/or whether changes are needed.
- Even if national “standards” are not achieved, having consistent regional versions will make it easier to develop regional recommendations and apply for regional grants

Nitrogen Recommendations for Corn:

Current N recommendations for corn are not as accurate as they appear – even though many (growers, regulators, etc) view them as set in stone. In addition changes in production, hybrids and technology have occurred that may impact crop needs. Would be good to come up with a better way to make recommendations than we do now – one that is often based on yield goal and an N use factor (e.g., 1 lb N/bu expected yield).

Initial discussion focused on what is going on currently:

- Methods / information currently being used
 - lb N/bu yield
 - economic yield goals
 - yield history
 - yield potential from soil survey,
 - Cornell – insufficient info, no recommendation
- who is making the recommendations
 - Land grant university
 - Extension nutrient management planners
 - Crop consultants
- what the concerns and limitations are across the region
 - old data
 - restrictive rates
 - yield goal is not a good predictor of yield
 - problems predicting contributions of soil and manure mineralization and irrigation water N
 - overall uncertainty in making predictions in a biological system

Proposed improvements being suggested or being tested currently:

- Using a range rather than a single recommended rate
- Adaptive N management
 - Cornell’s version allows grower to use when you don’t have field history and/or you think you need more N – must include CSNT and manage within 2 years to get CSNT < 3000 ppm
- Strip trials to test alternative rates – small trials within the field

- Look at developing yield zones that can work with VRT – cost effective when variability is high /. Prohibitive when variability is low

Goal: Gather information on studies in place to discuss next year. Could this be a potential regional project? Can it be proposed to a body such as the CBP for development of a regional database? How tight does data need to be for it to be useful for regional models?

The group adjourned at 5pm to allow Laurel Villa to set up for Dinner.

Friday, October 11, 2019.

The meeting was called to order at 8:05 am.

Update on NAPT:

An update was provided from information sent by Grant Cardon and John Lawley.

Grant will be retiring as Program Coordinator in 2019 and an RFP for a new Coordinator will be issued in the Spring by SSSA and the NAPT Oversight Committee.

Mn Deficiency:

Discussion was led by Amy Shober. Manganese deficiency is occurring more frequently in some parts of the region. Its being observed in alfalfa, soybeans, turf in golf courses, Christmas trees, and others.

Deficiency appears to be related to:

- Soil pH
- Soil drainage – can increase or decrease occurrences
- More issues in Roundup ready varieties of some plants – is the critical value for those varieties different?
- Possible interactions with soil Ni

Management / Treatment

- Easy to fix but most fixes are temporary
- Soil treatments may need to be reapplied each season
- Foliar applications are effective – may need to be applied multiple times per season. Can be cost effective
- Cannot be tank mixed with Roundup as it is a chelator
- Recommend a pH of target 6.2 rather than 6.5
- Use of acid starter fertilizer may increase the availability of soil Mn in the rooting zone sufficiently to meet crop Mn needs.

More work is needed to look at this issue.

Nutrient Management for Organic Ag

Joseph Heckman led a discussion on nutrient management issues for organic agriculture focusing on similarities and differences with nutrient management under traditional ag practices and where additional research and educational efforts are needed.

Evaluating Mo Uptake by Forages Grown on Steel Slag Amended Soils: Implications for Animal Health

John Spargo and Charlie White provided a summary of a project that they are working on with Marvin Hall and Bob Van Saun at Penn State. The project was initiated after health problems were reported among animals grazing on forages grown on steel slag amended soils. Steel slag is a readily available liming material in the area. Plant analysis of the forages in question as well as soil testing of samples from the sites raised questions on the availability and uptake potential of Mo in those amended soils and forage and its relationship with molybdenosis on the animals. The results of greenhouse pot studies with similarly treated alfalfa and orchard grass were informative and concerning and lead to installation of field plots to obtain further data. An update on the project next year would be helpful.

Advancing Data Management for Improved, Regionally Specific Fertilizer Guidance

John Spargo provided a summary which was present to the group. This topic was first discussed at the Joint Meeting in 2016 came up again for discussion at the SERA-6 Meeting in June 2018 which John Spargo attended. Nathan Slayton (Univ of Arkansas) of SERA-6 took the lead on preparing a proposal to the NIFA Foundational and Applied Science Initiative to apply funding to support a nationwide effort to develop the database. A Letter of Intent resulted in a request for a Full Proposal which is due October 31, 2019. Pete Kleinman of ARS was able to provide some initial funds to begin work and Deanna Osmond has taken the lead on working on the preliminary efforts on the database. The proposal requests that some of the funds be made available to help support regional planning meetings with groups like ours to discuss and offer input to issues such as database content, structure, management, regional data needed and/or currently etc. It was also hoped that some funding could be made available to LGUs for help in locating and converting older data to a format compatible with the database structure chosen.

An update on this project should be provided at next year's meeting.

State Reports – See attached files

Plans for next year:

Organizers for 2019 – Delaware and 2020 – Maine

Tentative dates – 10/3-10/4/19, 12 noon to 12 noon.

Tentative location- Laurel Villa

Notes:

- Watch for emails related to Land Grant University Survey, National Database Project
- Look through files for calibration data
- Send updates for the Recommended Soil Testing Procedures Appendices to Dawn (Methods) and Bruce (ICP wavelength table)
- Send ideas for relevant topics for next year to Amy or Karen

NECC-1812 Annual State Report For Connecticut

Reported October 2018 for period: Calendar 2017

Contact	Thomas Morris	Dawn Pettinelli Joseph Croze
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e-mail address	thomas.morris@uconn.edu	dawn.pettinelli@uconn.edu joseph.croze@uconn.edu
Website address	www.soiltest.uconn.edu	

Lab personnel FTE's: 2 + ½ Special Payroll (12 months) + Student Labor

Extractant(s): Modified Morgan for mineral soils, water for SME for greenhouse soils,

Instrumentation: Spectro Genesis ICP, Unity Westco Smart Chem 170 Discrete Analyze for ortho-phosphate and nitrogen-nitrogen, nitrate electrode for tissue NO₃-N (Cornstalks), Elementar VarioMax

Cost for routine test: \$12

Routine test includes: pH, Ca, Mg, K, P, Mn, Cu, Zn, Fe, Al, B, estimated total lead, estimated CEC, % BS & modified Mehlich buffer pH.

Sample Summary:

Category	Soil	SME	Plant
Total Samples	10.983	260	1391
Total MM	8474		
Commercial MM	NA		
Homeowner MM	NA		
Dept Research MM	NA		
Nitrate/PSNT	678		
Teaching (in MM & misc)	195		
Misc – OM, Tex, SS, pH	1818		
Cornstalk NO₃			202
Total N – Elementar	13		496
ICP Plant Tissue			693

Summary of Research:

Spatial variation of routine soil testing extractable nutrients, pH, nitrate, OM and SLAN in manured Soil and tissue testing for N in turf. Leaching of P where compost applied to turf. Calculation of an environmental critical concentration for P in Connecticut soils, and calculation of how much P from fertilizer and manure is required to increase soil test P one pound per acre.

Other/News:

New technician, Joseph Croze, started formally in June.

Master Composter program offered in October 2018

Still working out a few kinks in new Access soil test recommendation program - reporting.

Purchased a Spectro Genesis ICP – works very well, so far pretty low maintenance.

Planning on doing an incubation study to confirm modified Mehlich buffer limestone recommendations.

Planning to set up ammonium on the Westco.

NECC-1312 Annual State Report for Maine

reported October, 2018

(sample numbers for calendar 2017)

*Long and
agony death
for ICP*

Contact: Bruce Hoskins
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Email: hoskins@maine.edu
Web site: umaine.edu/soiltestinglab

Lab personnel FTE's: 4 technical, 2 professional, 1 IT/Administrative

Extractant(s): modified Morgan (ME, VT); Morgan (NY); NH₄Cl (forest soils), others on request

Instrumentation: TJA iCAP-6300 ICP, OI Analytic & Lachat Ion Analyzers, Labfit pH system, Leco Tru-Mac combustion analyzer, AIM600 Kjeldahl block digester, Dionex ICS-1000 Ion chromatograph, CEM MDS-2100 microwave system, PE FIMS-100 Hg analyzer

as of August, 2018

← 30 more

Cost for routine test: \$18 (\$15 volume or winter discount), \$25 with NH₄/NO₃ (Comprehensive test)
Routine test includes: pH, LR (mod Mehlich), OM, P, K, Mg, Ca, S, B, Cu, Fe, Mn, Zn; Na, (Cd, Cr, Ni, Pb)

Sample Number Summary (for calendar 2017)

	ME+VT+NY Soil	Plant	ME+VT Manure	Compost	Metals	Other	Prepped for instrument
Commercial	11500	560	475	215	230	100	1275 ICP
Homeowner	4200					(lime/fert)	1775 FIA
Research	330	525					1675 TN/TC
NO ₃ /PSNT	535 GH/HT	350 pet.					
Other	420 HT Res.						
	710 Solvita						
	190 PSI						
	270 FS						

High Tunnel

Summary of Research (2018)

- Organic bread wheat production - collaborative w/ VT (continuing grant).
- Nutrient and Pest Mgt in High tunnel production (MM & SME) + IPM - year 3 of 3 yr SARE grant.
- Organic Vegetable production systems (weed control & rotation strategies) 3 yr joint OREI grant.
- Permanent Bed production system project (OREI)
- Multi-state comparison of manure type on soil health indices in vegetable production (ME, MD, CA, MN)
- Weed control strategies in vegetable production.

News/Other (2018)

- Cost analysis on all regular services resulted in 20% avg. increase on most sample fees.
- Multple breakdowns in one remaining OES system has caused bottlenecks in analysis and longer TAT.
- In process of purchasing second OES system, to improve throughput and backup capability.
- Lab continues with fixed Exp. Sta. input for Grad project samples (short proposal required).
- Continued evaluation/comparison Soil Health/SoilQuality indicators and enhancements - SLAN, POXC
- Subcontracting from several private labs for combustion, lime eq., fertilizer methods.

NECC-1312 Annual State Report For Rutgers/NJAES Soil Testing Laboratory

Reported October 2018 for period: July 2017 – June 2018

Contact	Stephanie Murphy, Ph.D.
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e-mail address	soiltest@njaes.rutgers.edu
Website address	https://njaes.rutgers.edu/soil-testing-lab/

Lab personnel FTE's: 3.8**Extractant(s):** Mehlich-3

Instrumentation: Thermo 1600 Radial ICP Spectrometer,
 Elementar vario MAX cube CN analyzer,
 Seal Analytical Autoanalyzer

Cost for routine test: \$20

Routine test includes: Soil pH, Adams-Evans buffer pH, P, K, Ca, Mg, Cu, Mn, Zn, B, Fe;
 recommendations for 2 crops/plantings.

Sample Summary:

Category	Soil	SME	Plant	Water
Total Samples	7216	140	578	97
Commercial (farm, greenhouse, landscaper, golf course, govt., NPO, other)	4091	97	0	17
Homeowner	2365	13	0	0
Rutgers Research	760	30	578	80
Nitrate/PSNT	395	140	0	97
Teaching	0	0	0	0
Misc – OM, Texture, EC, pH etc.		140		97
Cornstalk NO₃	-	-	-	-
Total N – Elementar	322	61	366	0
ICP Plant Tissue	-	-	290	-
Solvita CO₂	242	78		

Summary of Research:

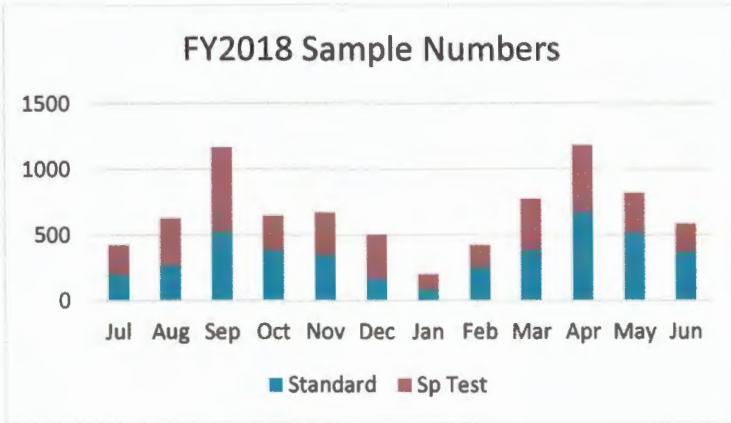
- 1) Organic Sweet Potato Response to Soil Test Nitrogen Fertility
- 2) Soil Nitrogen Availability Following Sunn Hemp or Sudan Grass Cover Crops
- 3) Nutrient Management for Organic Lawn Care
- 4) Determining Optimum Wollastonite Application Rates for Supplying Silicon to Pumpkin

Other/News:

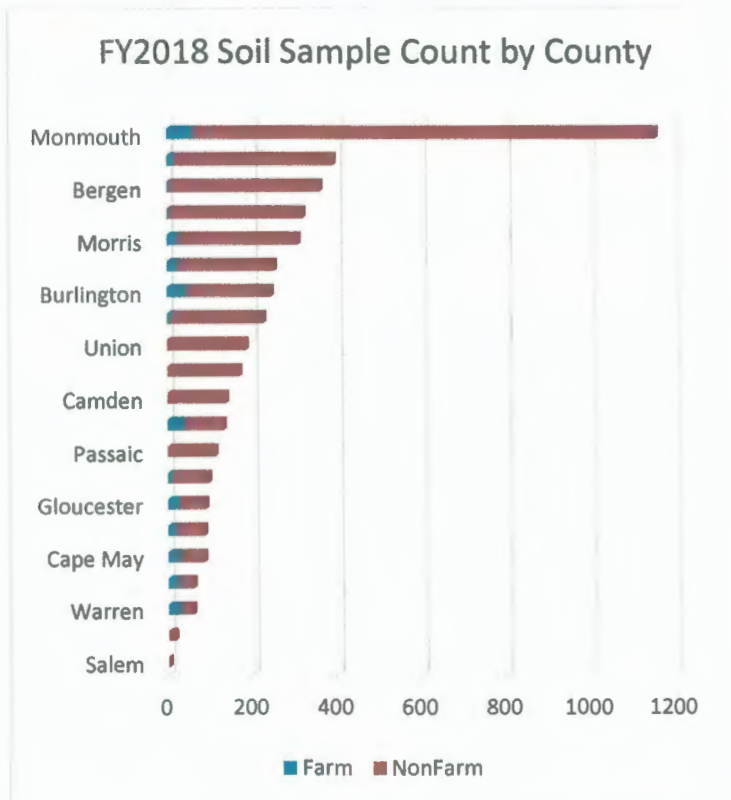
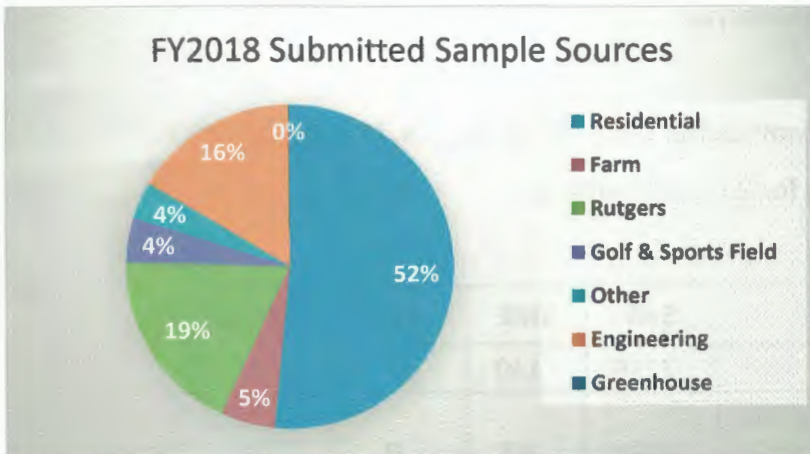
Updates to SLIMS database (V.6)

Optimal Solutions Inc. submitting USDA-SBIR proposal: Rapid Soil Testing Using Portable Sensing Technologies

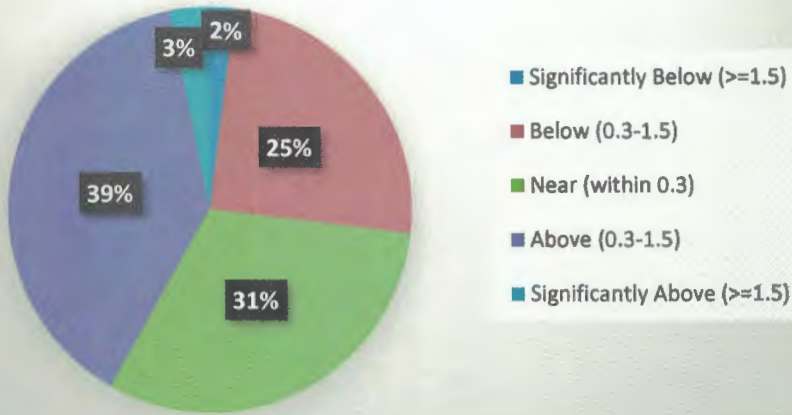
Data/Graphics from FY18 Annual Report:



48% of samples had special tests performed (something other than or in addition to standard fertility test)

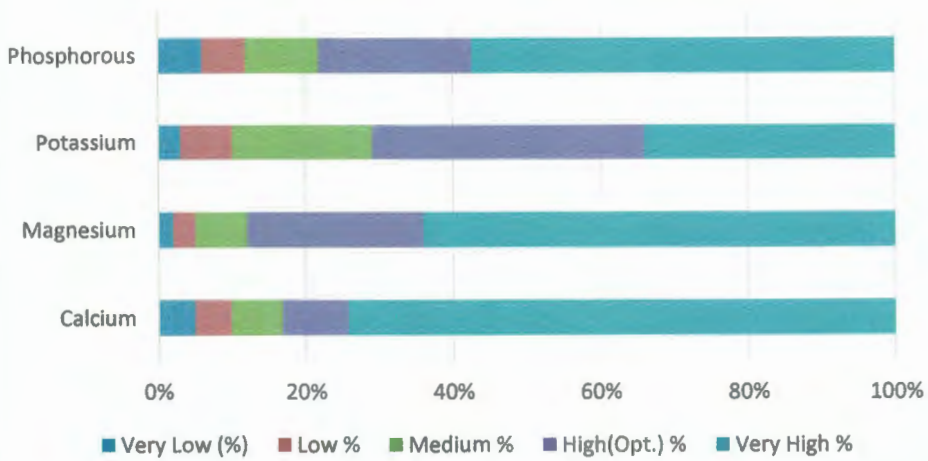


Fiscal Year 2018 Soil pH Result Summary



(Relative to Optimum for crop indicated)

FY 2018 Soil Test Nutrient Relative Level



Samples with at least one element below optimum: 44%

Summary of Research

Evaluation of mine drainage residuals to reduce water soluble P and P runoff from surface applied manure - Recently completed work to determine efficacy of MDR to reduce manure WSP and evaluate impact on runoff P losses from surface application of treated manure. Manuscript in review. Collaboration among Penn State, ARS, and Iron Oxide Recovery/Hedin Environmental.

Sulfur response work - Recently completed sulfur response experiments on corn at 30 locations across PA, 2015, 2016, 2017. Evaluating correlation between Mehlich 3, MCP, and SrCl₂ extractable S and RY. Also validating corn earleaf S sufficiency range. Paper will be presented at 2018 ASA meetings in Baltimore.

Analysis of contaminants in cocoa (cadmium), and soil remediation - pilot project seeks to develop working capacity between partners in order to achieve our long-term goal of minimizing cocoa Cd concentration and making Peruvian cocoa commercially satisfactory for the world market. Via collaborative field sampling campaigns and institutional exchange programs with students and faculty, we begin to build a long-term research program. Collaborations b/t Penn State and Universidad Nacional de Ingeniería.

Mo uptake by forages grown on steel slag amended soils: Implications for animal health – Research evaluating Mo uptake by forages (alfalfa and orchardgrass) grown in soil amended with a widely available limestone alternative and the associated risk of molybdenosis in livestock. A greenhouse trial was recently completed. Field trial planted fall 2018 to validate our results. Work is being funded by the Pennsylvania Dept. of Ag. Animal Health and Diagnostic Commission

Precision soil fertility in soybeans - Research evaluating the use of soil EC maps, yield maps, and planter data to determine soil fertility management zones and testing the responsiveness of soybeans to P, K, and S fertilizer additions. Work is funded by Pennsylvania Soybean

Nitrogen fertility recommendations crediting cover crops and soil organic matter - Research testing methods to assign N credits to soil organic matter and cover crop residues and adjusting N fertilizer rates accordingly. The research is using various biogeochemical equations and algorithms calibrated to local soil and environmental conditions to calculate N credits based on site specific measurements of soil organic matter, cover crop biomass N content and C:N ratio. Research is being conducted a plot scale and on commercial production fields using variable rate prescriptions. Rates and ratios of starter versus sidedress nitrogen fertilizer are also being evaluated under different cereal rye cover crop termination timings. Work is funded by Northeast SARE.

Mid-infrared FTIR spectroscopy to evaluate soil organic matter chemistry and other parameters - Mid-infrared spectroscopy is being used to assess the prevalence and relative composition of different soil organic matter functional groups and their association with microbial community composition as identified by phospholipid fatty acid analysis. We will also assess the instrument's capability to predict other soil fertility parameters of interest.

NECC-1312 Annual State Report For
Reported October 2018 for period: Calendar 2017

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FAX number	
e-mail address	wvu.davis.soiltesting@gmail.com
Website address	https://soiltesting.wvu.edu/

Lab personnel FTE's: 1 (12 months) + Student Labor

Extractant(s): Mehlich I until August 2018 (starting September 2018, Mehlich III).

Instrumentation: ICP-OES - Optima 2100 DV (PerkinElmer Inc.)

Cost for routine test: \$0 for WV residents, \$10 for out of state clients.

Routine test includes: pH (water 1:1), Ca, Mg, K, P, estimated CEC, % BS & Mehlich buffer pH.

Sample Summary:

Category	Soil	SME	Plant
Total Samples	8688		
Commercial MM	N/A		
Homeowner MM	8,399		
Dept Research MM	289		
Nitrate/PSNT	N/A		
Teaching	150		
Misc – OM, Tex, SS, pH	60		
Cornstalk NO₃	N/A		
Total N – Elementar	N/A		
ICP Plant Tissue	N/A		

Summary of Research:

No funded research projects related to the West Virginia University Soil Testing Lab were performed in 2017. Projects related to Soil Health Testing are being developed.

Calibration curves for the transition from Mehlich I to Mehlich III extractant were developed.

Other/News:

Organic matter content estimated by Loss on Ignition (LOI) is an additional analysis performed by our lab at a cost. Starting September 2018, the WVU Soil Testing Laboratory transitioned from Mehlich I to Mehlich 3 extractant.

The new Mehlich III based fertilizer recommendations were developed by Dr. Ed Rayburn (WVU Extension). The number of crops with recommendations increased from 19 to 77. Jim Hintz (WVU Extension) developed a new data processing software based on "Cold Fusion" programming with assistance from Dr. Rayburn and Dr. Eugenia Pena-Yewtukhiw (WVU Soil Testing Laboratory.) The WVU Soil Testing Laboratory (Davis College of Agriculture, Natural Resources and Design) is testing the software.

Soil Testing Lab Website needs to be updated to accommodate the new extraction procedure.