

The Soil~Plant Analyst



A NEWSLETTER DEDICATED TO THE AGRICULTURAL LABORATORY INDUSTRY
A Quarterly Newsletter of the Soil and Plant Analysis Council, Inc., December 2020

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Next Issue March 2021

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Message from President John Spargo



As we approach the final weeks of 2020, I cannot help but reflect on what a challenging year it has been. We are close to one year into a global pandemic, the likes of which have not been seen in over a century. While there is promising news of effective vaccine development, most health officials indicate we are a long way from being in the clear. Even after COVID-19 has been brought under control, will we return to *business as usual*? Probably not.

I generally hold the perception that *every challenge offers opportunity for growth*, and while this challenge has been immensely different than any other, I'm finding it helpful as we persist and continue to create solutions to this unexpected and unfortunate situation. All of us have had to adapt the way we run our labs, conduct research, interact with our clientele, and communicate with our colleagues. For example, in my program we have had to become more effective at managing schedules to both minimize building occupancy and foster physical distancing, and to accommodate our staffs' family obligations. We have had to improve our inventory management in response to supply chain disruptions, and we have had to transition most of our routine communications to electronic platforms. While these adaptations were challenging to implement, integrating them into our workflow has allowed us to continue to meet our clients' needs.

We are well into the fall soil sampling season and sample volume in our lab is equal to or greater than previous years. Based on what I have heard from colleagues, all indications are that

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John Spargo, Penn State University ph 814-865-9155. Email: jts29@psu.edu

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Leticia Sonon. Nutrien Ag Solutions. (559)-369-2229 E-mail: Leticia.Sonon@Actagro.com

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405-744-9566; hailin.zhang@okstate.edu

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Steve Harrold— ServiTech Labs, Tel: 620-227-7123 email: steveh@servitechlabs.com

Quirine Ketterings— Cornell University, Tel: 607 255 3061. Email: Qmk2@cornell.edu

Rao Mylavarapu— UFL, Tel: 352-294-3113
Email: raom@ufl.edu

Kristin Hicks - North Carolina Dept of Agriculture, and Crop Services Tel: 919.733.2655
Email: Kristin.Hicks@ncagr.gov

Luke Baker, Brookside Laboratories Inc. New Brennan Brookside Laboratories, Inc. Phone: 419-977-2766 Email: lbaker@blinc.com

Individual Class Members:

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Email: r.mikkelsen@apni.net

Bill Urbanowicz -Spectrum Analytic, Inc., Tel: (800) 321-1562 bill@spectrumanalytic.com

Ray Ward-- Ward Laboratories. Tel: 308-234-2418. Email: RayWard@wardlab.com

Membership privileges

SPAC membership offers discounted rates for two journals: Communications in Soil Science and Plant Analysis and the Journal of Plant Nutrition. Journal subscription includes online access to past Journal issues. Membership in the Soil and Plant Analysis Council for 2020, includes quarterly newsletters, announcements on laboratory analysis workshops, laboratory supply discounts, discount registration for the international symposiums. To renew for 2021: contact Dr. Robert Miller, SPAC Secretary / Treasurer.



Continued From Page 1

the same is true for most labs this fall. While we all continue to operate under these alternative conditions as part of mitigation efforts, some of our changes may persist when the pandemic is truly under-control, but others will go. Taking time to reflect on, and evaluate which changes are for the better, and which ones should be dismissed, can be a shared opportunity to learn from one-another at every level.

It appears ever more likely that the next *International Symposium on Soil and Plant Analysis* (ISSPA) will be held virtually — the SPAC board will take the issue up at the next annual meeting and have follow-up discussions with the ISSPA *International Governance Committee*. Whatever the format, we will have plenty to discuss and learn from one another as we navigate these challenging times and plan for the future.

I hope this message you well. I look forward to seeing you all *in person* very soon.



SPAC President Elect - Kristin Hicks

Kristin Hicks is the new President elect of SPAC. She is North Carolina native with an M.S. in Soil Science from North Carolina State University and a Phd in Soils and Biogeochemistry from the University of California at Davis. Dr. Hicks is the Section Chief of the Plant/ Waste/ Solutions/ Media Section within the Agronomic Division of the North Carolina Department of Agriculture and Consumer Services. During her six years with NCDA, she has overseen the state agronomic laboratories that provide plant tissue analysis, animal waste and compost testing, nutrient solutions and agricultural water testing and greenhouse media testing for North Carolina growers. Her current work includes development of plant tissue sufficiency ranges for primocane-fruited blackberries and for CBD varieties of Cannabis sativa. In collaboration with university partners, she has established cannabis sufficiency ranges based on extensive survey data in field and greenhouse varieties.



AMMONIA & NITROGEN

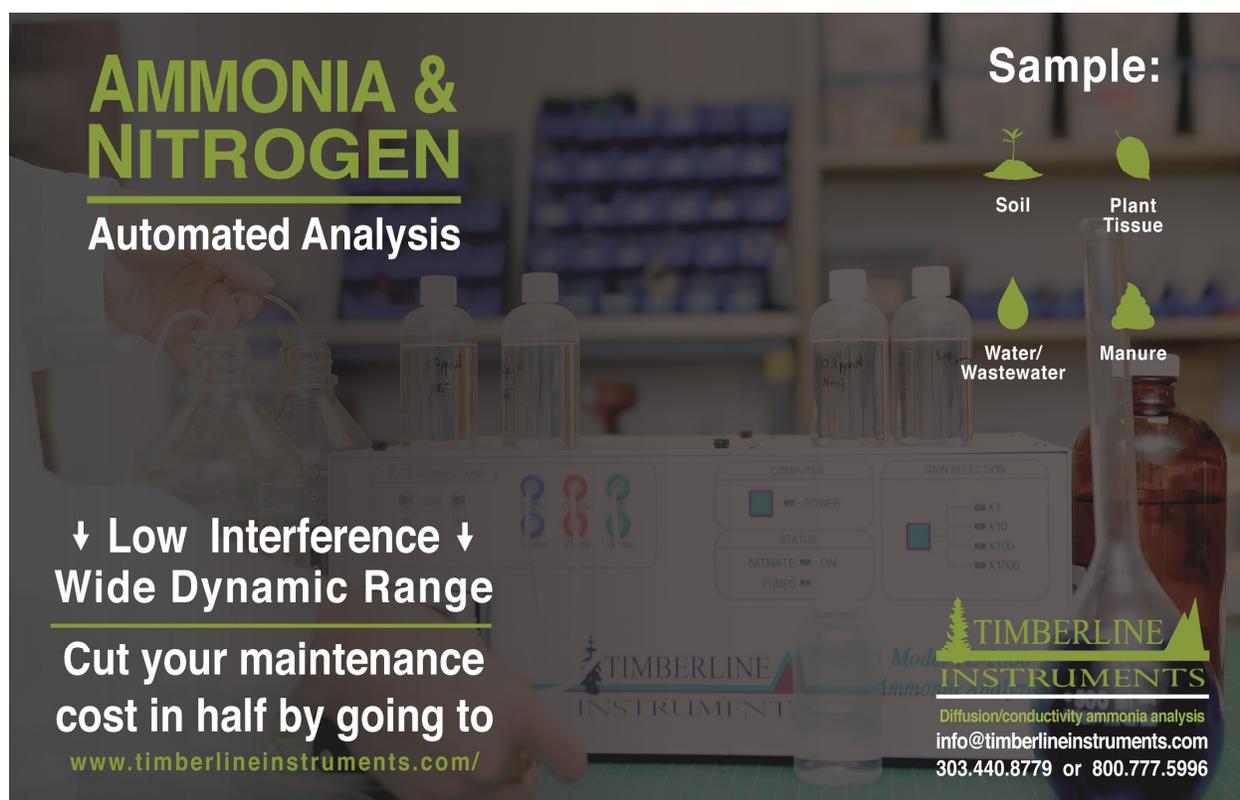
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ALTA (formerly ISTA) meeting

The Agricultural Laboratory Testing Association (ALTA), formerly identified as the Illinois Soil Testing Association (ISTA), had an online virtual meeting August 27, 2020. The meeting included three presentations: *Sally Flis* - Agronomist / The Fertilizer Institute (TFI), on The importance of soil testing as related to environmental regulations; *John Spargo* - Penn State University, on FRST / The Fertilizer Recommendation Support Tool, A national soil testing database to improve fertility recommendations; and *Robert Miller* - ALTA Advisor / ALP program, on ALTA-SAC program results and updates on the plant certification program.

The ALTA business meeting discussed the ALTA.Ag web site and reviewed informational elements of the site. The ALTA board discussed ongoing revisions to the ALTA bylaws with final review completed in December. The board discussed operational protocols of the Plant Analytics Certification (PAC), methods to be covered, statistical protocols, certification requirements. The PAC program will be initiated for laboratories across North America in January 2021. An ALTA webinar entitled, Laboratory Quality Management - Assessing Performance is scheduled for January 19, 2021. The next ALTA meeting is scheduled for February 16, 2021, for more information on the ALTA organization, contact Gary Fisher, gfisher@unitedsoilsinc.com.

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Proficiency sample quality

Laboratory proficiency testing (PT) provides an external measure of laboratory analytical performance, of which the most critical component is the quality of the proficiency test sample. PT sample homogeneity is the basis of evaluating laboratory method bias and intra-laboratory precision and samples lacking in homogeneity result in high inter-lab variation which cloud the interpretation of results. Proficiency providers should follow recognized international protocols which insure sample homogeneity. Specific PT sample matrices, may require special preparation to accommodate sample moisture content, volatile components or particle segregation to ensure homogeneity. With regard to botanical samples, this requires dry, very finely ground samples, thoroughly blended and packaged in secure sample containers. Finally, PT samples require evaluation to ensure homogeneity standards are met.

The Agricultural Laboratory Proficiency (ALP) Program provides four plant-botanical PT sample materials each cycle. Steps are taken to secure a broad spectrum of representative plant species in sufficient quantities to meet the program requirements. Sample materials are dried, ground in a Cyclotec mill, sieved at 400 um minus, thoroughly blended in a drum blender and package in polystyrene jars. This protocol results in well homogenized samples with CVs < 4% for macronutrients across a range of plant species. Ultimately though, what is the quality and accuracy of PT samples?

In 2018 fourteen kg of dried ground pistachio leaves were secured from central California testing laboratory for use in the ALP Program. The material was sieved, reground as necessary, thoroughly blended, and split into two aliquots: 1.5 kg submitted in 2019 as SRB-1901 in ALP cycle 38; and 10.0 kg shipped to the Wageningen Evaluating Programmes for Analytical Laboratories (WEPAL) in Wageningen, The Netherlands for use in their PT program submitted in 2020 as IPE 250. Data was compiled from the two proficiency programs.

A comparison of the PT results indicates near identical median values for the elemental analyses evaluated between the two PT programs (Table 1, page 6). Although nitrogen by combustion shows a difference of 0.10 % N, a relative difference of 3.8% between of the medians of the two PT programs, those for P show an absolute difference of 0.002 % P, and for K 0.036 %. Median concentrations for Mg and B were identical between programs. With the exception of Zn median values for Ca, S, Mn, Cu, Mo and Pb results were nearly identical between the two programs. A comparison of inter-lab variance (MAD) between the two PT programs indicates near identical values for P, K, Mg, B, Mn, Cu and Pb. Results for N and Zn discrepancies in MAD values between the two PT programs, with lower MAD values for N in the ALP program, and lower values for ZN for the WEPAL program for the pistachio leaf.

This comparison of results of a pistachio leaf PT sample by two international providers indicates a high degree of consensus in the statistical results of the inorganic element constituents and represent the “true” analytical concentrations. Overall, the outcome of this international exchange demonstrates the high quality botanical materials used in the ALP testing program.

Table 1. Comparison of proficiency data for pistachio leaf, ALP SRB-1901 and WEPAL IPE-250.

Elemental Analysis	ALP results SRB-1901		WEPAL results IPE 250	
	Median	MAD	Median	MAD
Nitrogen (Combustion) (%)	2.520	0.033	2.620	0.063
Phosphorus (%)	0.152	0.008	0.154	0.006
Potassium (%)	2.014	0.086	2.050	0.088
Calcium (%)	2.25	0.14	2.31	0.08
Magnesium (%)	0.460	0.017	0.460	0.016
Sulfur (%)	0.168	0.011	0.171	0.007
Boron (mg/kg)	227.0	12.0	227.0	15.6
Manganese (mg/kg)	65.9	3.7	66.3	2.0
Copper (mg/kg)	17.1	0.88	17.0	0.92
Zinc (mg/kg)	127.0	7.2	131.0	4.6
Molybdenum (mg/kg)	0.45	0.10	0.50	0.76
Lead (mg/kg)	0.115	0.024	0.110	0.022

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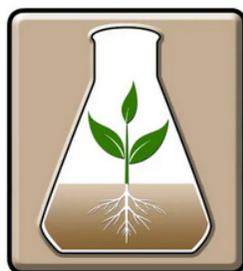
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ALTA Plant Analysis Certification program

The Agriculture Laboratory Testing Association (ALTA) has developed a certification program for plant analysis laboratories, Plant Analysis Certification (PAC) program. The objective of this program is to assure plant nutrient analysis provided to Ag producers in the US are within laboratory statistical norms. Annually the ALTA-PAC assessor performs a statistical analysis of ALP plant analysis data. Laboratories must have 10 of 12 analysis proficiency results with inter-lab confidence limits. A laboratory that fails to meet method performance limits of the ALTA-PAC program, will be offered a retest, and program for reinstatement. Laboratories failing the retest plant sample set, shall have an independent consultant audit the lab's plant analysis method operation and performance at their cost.

Laboratories that wish to participate in the ALTA-PAC program are required to: (1) Be a member of ALTA; (2) be enrolled in the ALP Program for the calendar year; (3) provide plant nutrient analysis by methods recognized by the ALTA for each ALP cycle. PAC program analysis groups are: (i) macro nutrients: N, P, K, S, Ca, and Mg; (ii) Micro nutrients: Zn, B, Cu, Mn, and Fe; and (iii) Optional: $\text{NO}_3\text{-N}$, $\text{NH}_4\text{-N}$, $\text{PO}_4\text{-P}$, and Cl.

Enrollment for 2021 is now open, cost is \$350. More information can be found at: <https://alta.ag/plant-analysis>. Or contact Gary Fisher: gfisher@unitedsoilsinc.com



ALTA
**AGRICULTURAL LABORATORY
TESTING ASSOCIATION**

The Agricultural Laboratory Testing Association is an organization of professionals dedicated to:

- ◆ Quality soil testing and analysis
- ◆ Accurate reporting
- ◆ Sound management advise
- ◆ Information sharing

For more information visit www.ALTA.AG

Compost: STA-CAP Program

The USCC Seal of Testing Assurance Compost Analysis Proficiency (STA-CAP) program provides tri-annually three compost materials for the analysis of compost based on test methods published by the US Composting Council (USCC) in: Test Methods for the Examination of Compost (TMECC). The Program is divided into two tiers: STA covering inorganic analyses and biological analyses. Labs enrolled in STA are eligible for meeting the USCC Seal of Testing Assurance (STA) published on the USCC web site. Inorganic methods include SOM-LOI, pH, EC, TOC, C:N ratio, NH₄-N, NO₃-N, P, K, Ca, Mg, Na, S, and EPA 503 total metals. Biological methods include seedling germination and vigor, respiration, CO₂ respiration test and pathogens. Fifteen labs are enrolled in the 2020 program representing. For more information on the 2020 STA-CAP program contact: Robert.Miller@CTS-interlab.com.



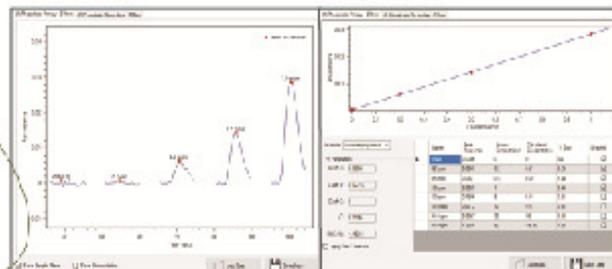
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SPAC Standard soil scoops

The Soil and Plant Analysis Council offers standard soil scoops for soil testing laboratories. Standard scoops sizes are: 1.0g, 1.5g, 2.0g, 5.0g, 10.0g and 15.0g based on an assumed soil density of 1.18 grams per cubic centimeter. Scoops are manufactured from high quality steel with wooden handles. Soil scoops are offered in multiple handle sizes, 4.0" and special order 5.0" in length, along with optional high density foam grips. Additional scoop sizes are available on a special order status and custom fabricated specialty scoops based on a specific volume and/or scooped mass can be ordered. New for 2020 SPAC offers soil spatulas for tap and soil leveling. Spatulas come in two sizes 6" or 9" blades in length.

Scoops can be purchased via an order addressed to the SPAC secretary, RMiller@SP-Council.org.

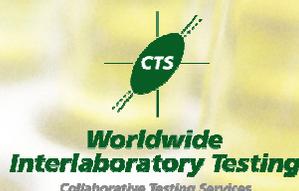


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- A complete archive of standard reference soil and botanical materials
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Calendar of Events for 2021 - 2022

January 19, 2021. ALTA Laboratory webinar on Laboratory Quality, online.

January 26-29, 2021. US Compost Council Ontario Convention Center, Ontario, CA, USA.

March 4-5, 2021. Western Nutrient Management Workshop, Virtual Meeting.

June 6-10, 2021. Canadian Society of Soil Science Annual Meeting. Charlottetown, PEI, Canada. (*rescheduled from 2020*)

June 2021. Joint Meeting of Soil Regional Workgroups, SERA-6 NEC-67 and NCERA-13. Clemson, SC, USA.

August 2021. Agricultural Laboratory Trade Association Summer Meeting. Site to be determined.

November 7-10, 2021, Soil Science Society of America Meeting, Salt Lake City, UT, USA.

November 2021. North Central Soil Fertility Meetings. Des Moines, IA

November 6-9, 2022. Soil Science Society of America Meeting, Baltimore, MD, USA.



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