

*The ALP Program is operated by Collaborative Testing Services, Inc.
in cooperation with Robert O. Miller, PhD, Program Technical Director*



The Agriculture Laboratory Proficiency (ALP) Program Fall 2019 (Cycle 40) was completed in November 2019, with participation by 105 labs from the United States, Canada, Guatemala, Honduras, South Africa, Italy, Ukraine, and the Philippines. Proficiency samples consisted of five soils, four botanical and three water samples. Analytical methods evaluated are based on those published by AOAC, four regional soil work groups, the Soil Plant Analysis Council and Forestry Canada.

This Individual Performance Analysis report presents results that are particular to your laboratory. All properties and samples for which your laboratory reported results are presented in this report. An analysis of between and within laboratory performance for soil, botanicals, and water properties follows this page. A summary of results follows immediately after the analysis for each sample type. This summary condenses your between laboratory performance on a single page and may be the best place to start the review of your results.

Standard Reference Soils (SRS), materials used for the soils program were: SRS1911 a Marvyn loamy sand collected from Auburn, AL; SRS1912 a Haverson clay loam collected from Hardin, MT; SRS1913 a Shellabarger fine sandy loam collected from Danville, KS; SRS1914 a loam collected from near St Lambert de Lauzon, Quebec CANADA; and SRS1915 a Canisteo clay silt loam collected from Badger, IA. Standard Reference Botanical (SRB) materials were: SRB1909 almond leaf composite from CA; SRB1910 corn silage composite from WI; SRB1911 parsley leaf composite from OR and SRB1912 spinach leaf composite from CA. Standard Reference Water (SRW) solutions represent agriculture water samples collected from: SRW1907 a canal in ID, SRW1908 a canal in OR, and SRW1909 a creek in CO.

It is important to remember that all ALP Program evaluations are based on comparative and consensus statistics; users must be aware that small group statistics are inherently less robust than large group statistics, even though robust evaluations have been preferentially chosen. No comparative results are provided for analyses with fewer than 5 reported results. Results of all laboratories that reported for each property may be found in the web-based summary report posted on the CTS Web site.

Quick Key to your Performance Analysis Report

Lab Mean	The mean of the triplicate determinations submitted for each sample-property.
Grand Median	The median of all included Lab Means submitted for each sample-property.
MAD	The median of the differences (absolute values) between the Grand Median and the Lab Means.
95% Conf Interval	The estimated range of value which is likely to include the sample-property value, calculated from the Grand Median and the M.A.D.
WithinLab Performance, k	The ratio (standard or z-score) of each laboratory standard deviation within each sample-property and the WithinLab Avg STD (see below). A score of 1 indicates that variation within a laboratory for that sample-property was the same as the average variation.
WithinLab Avg STD	The average (sum of squares) of the standard deviations of the triplicate determinations submitted for each sample-property.
Laboratory-Sample Bias (from summary page)	The ratio (standard or z-score) of each laboratory difference, between the Lab Mean and the Grand Median, and the M.A.D. A score of 0 indicates agreement of the laboratory with the consensus average.



Agriculture Laboratory Proficiency (ALP) Program

Fall 2019

Performance Analysis Report - Test Cycle 40

CTS Lab Code: U6401A

Web Code: NP96FK for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
101 Saturated Paste Moisture	Percent		SRS1911	22.9	21.5	1.40	17.4 - 25.6	0.09	1.1	24
			SRS1912	69.6	65.1	6.62	45.9 - 84.3	0.49	2.8	24
			SRS1913	33.3	27.6	2.90	19.2 - 36.0	0.11	1.6	24
			SRS1914	40.0	36.3	4.17	24.2 - 48.4	0.92	0.8	24
			SRS1915	59.3	48.7	4.93	34.4 - 63.0	0.44	1.5	24
102 pH - sp	Unit		SRS1911	4.90 X	5.24	0.06	5.07 - 5.40	0.00	0.06	23
			SRS1912	7.90	7.95	0.06	7.78 - 8.13	0.00	0.06	23
			SRS1913	4.00 X	4.39	0.07	4.18 - 4.59	n/a	0.04	23
			SRS1914	4.90 X	5.21	0.10	4.90 - 5.51	0.00	0.03	23
			SRS1915	7.00	7.19	0.09	6.93 - 7.45	n/a	0.05	23
103 ECe - sp	dS/m		SRS1911	1.31	1.58	0.10	1.28 - 1.88	0.26	0.08	28
			SRS1912	7.97 X	14.4	1.04	11.3 - 17.4	0.12	0.93	28
			SRS1913	1.36 X	1.90	0.13	1.53 - 2.27	1.53	0.07	28
			SRS1914	1.06	1.25	0.10	0.96 - 1.53	1.13	0.04	28
			SRS1915	1.99 X	2.73	0.14	2.32 - 3.14	0.78	0.12	28
104 HCO3 -sp	mmolc/L		SRS1911	0.31	0.27	0.10	0.00 - 0.57	0.00	0.02	8
			SRS1912	4.27	4.30	0.93	1.61 - 6.99	0.79	0.55	10
			SRS1913	0.31	0.28	0.17	0.00 - 0.76	0.09	0.06	8
			SRS1914	0.30	0.34	0.14	0.00 - 0.74	0.11	0.05	8
			SRS1915	2.85	2.95	0.48	1.56 - 4.33	0.60	0.29	10
105 K - sp	mmolc/L		SRS1911	1.18	1.35	0.14	0.93 - 1.76	1.38	0.04	19
			SRS1912	1.37	1.69	0.20	1.12 - 2.26	1.06	0.09	19
			SRS1913	0.50 X	0.62	0.027	0.54 - 0.70	2.53 X	0.03	19
			SRS1914	0.15	0.18	0.010	0.15 - 0.21	0.65	0.01	19
			SRS1915	0.21	0.25	0.014	0.21 - 0.29	0.28	0.02	18
106 Ca - sp	mmolc/L		SRS1911	5.46	6.25	0.61	4.47 - 8.03	0.12	0.64	25
			SRS1912	16.6	21.9	1.99	16.2 - 27.7	0.43	1.4	25
			SRS1913	7.49	9.76	1.16	6.39 - 13.14	1.59	0.47	25
			SRS1914	5.46	6.42	0.40	5.25 - 7.58	0.58	0.29	25
			SRS1915	19.4	23.0	1.82	17.7 - 28.3	1.05	1.0	25
107 Mg - sp	mmolc/L		SRS1911	2.78 X	3.71	0.28	2.88 - 4.53	0.06	0.36	25
			SRS1912	73.1	101.7	14.9	58.6 - 144.7	0.43	9.3	25
			SRS1913	3.71 X	5.40	0.50	3.94 - 6.86	1.93	0.29	25
			SRS1914	3.32	4.15	0.32	3.23 - 5.06	0.79	0.16	25
			SRS1915	3.25	4.14	0.40	2.98 - 5.30	0.70	0.18	25
108 Na - sp	mmolc/L		SRS1911	0.83	0.91	0.07	0.69 - 1.12	0.50	0.06	25
			SRS1912	89.7	99.4	11.9	65.0 - 133.9	0.78	6.4	25
			SRS1913	1.11	1.09	0.06	0.91 - 1.27	2.70 X	0.09	25
			SRS1914	0.89 X	0.69	0.05	0.53 - 0.84	1.40	0.05	25
			SRS1915	0.59 X	0.17	0.030	0.09 - 0.26	0.35	0.03	21
109 SAR - sp	value		SRS1911	0.41	0.40	0.020	0.34 - 0.46	0.57	0.03	17
			SRS1912	13.4	13.2	0.73	11.1 - 15.3	0.80	0.5	17
			SRS1913	0.47 X	0.40	0.018	0.35 - 0.46	2.19 X	0.03	17
			SRS1914	0.42 X	0.30	0.012	0.27 - 0.33	1.19	0.02	17
			SRS1915	0.18 X	0.051	0.007	0.032 - 0.070	0.78	0.01	12



Agriculture Laboratory Proficiency (ALP) Program

Fall 2019

Performance Analysis Report - Test Cycle 40

CTS Lab Code: U6401A

Web Code: NP96FK for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
111 SO4 - sp	mmolc/L		SRS1911	0.77	0.99	0.12	0.65 - 1.32	0.34	0.11	20
			SRS1912	162.0	199.6	38.2	88.9 - 310.4	0.33	13.8	21
			SRS1913	0.37	0.29	0.05	0.13 - 0.44	3.04 X	0.08	19
			SRS1914	0.52 X	0.22	0.022	0.16 - 0.28	3.47 X	0.03	17
			SRS1915	1.09 X	1.54	0.13	1.15 - 1.92	0.20	0.08	20
127 NO3-N Cd. Rd.	mg/kg		SRS1911	47.2	39.9	4.13	27.9 - 51.9	0.11	3.6	47
			SRS1912	85.5 X	68.7	3.68	58.0 - 79.3	0.27	2.5	47
			SRS1913	80.6 X	64.8	3.34	55.1 - 74.5	0.18	3.6	47
			SRS1914	71.7 X	56.1	2.32	49.4 - 62.8	0.30	1.9	47
			SRS1915	200.3	161.5	15.2	117.5 - 205.6	2.38 X	6.6	47
131 NH4 - N (KCl Extr.)	mg/kg		SRS1911	20.7	20.5	1.92	14.9 - 26.0	0.53	1.1	29
			SRS1912	8.67	8.68	0.81	6.33 - 11.03	1.12	0.52	29
			SRS1913	13.7	11.6	1.10	8.4 - 14.8	0.91	0.6	29
			SRS1914	7.33	6.77	0.57	5.12 - 8.41	1.05	0.55	29
			SRS1915	8.00 X	4.25	0.50	2.81 - 5.69	n/a	0.49	29
135 PO4-P Olsen/Bicarb (1:20)	mg/kg		SRS1911	73.0 X	30.4	3.01	21.6 - 39.1	n/a	1.7	39
			SRS1912	39.3 X	27.0	2.07	21.0 - 33.0	1.32	2.9	39
			SRS1913	51.3 X	15.2	1.16	11.8 - 18.6	1.98	1.3	38
			SRS1914	37.7 X	7.70	0.93	4.99 - 10.41	1.96	1.2	38
			SRS1915	42.0 X	17.3	1.61	12.7 - 22.0	0.89	1.1	39
141 K Ammonium Acetate	mg/kg		SRS1911	55.7 X	78.7	7.18	57.8 - 99.5	0.19	3.0	48
			SRS1912	469.0	508.9	20.4	449.8 - 568.1	0.44	13.7	49
			SRS1913	113.3	126.3	5.03	111.7 - 140.9	0.06	9.5	48
			SRS1914	71.3	79.5	4.17	67.4 - 91.6	0.67	3.4	48
			SRS1915	155.3	141.7	7.56	119.8 - 163.6	1.29	7.7	48
142 Ca Ammonium Acetate	mg/kg		SRS1911	320.7	338.2	49.8	193.7 - 482.7	1.52	23.6	46
			SRS1912	4,206.7	3,977.3	278.6	3,169.5 - 4,785.2	0.31	177.9	46
			SRS1913	721.3	765.3	47.2	628.5 - 902.2	0.07	30.8	46
			SRS1914	619.7	624.7	33.7	526.9 - 722.5	0.34	24.6	46
			SRS1915	7,630.0	6,851.7	588.0	5,146.5 - 8,556.9	2.64 X	280.6	46
143 Mg Ammonium Acetate	mg/kg		SRS1911	44.0	59.3	8.61	34.3 - 84.3	0.27	3.6	45
			SRS1912	2,626.7	2,724.9	223.5	2,076.8 - 3,373.0	0.13	114.4	46
			SRS1913	166.7	185.4	13.8	145.5 - 225.3	0.53	8.8	46
			SRS1914	137.3	147.1	10.00	118.1 - 176.1	0.20	7.5	46
			SRS1915	443.7	442.7	26.3	366.3 - 519.0	1.02	11.3	46
144 Na Ammonium Acetate	mg/kg		SRS1911	24.7 X	14.3	3.13	5.3 - 23.4	0.30	1.9	41
			SRS1912	2,506.7	2,438.1	102.9	2,139.7 - 2,736.5	0.37	101.6	42
			SRS1913	37.7 X	20.2	3.78	9.2 - 31.1	0.26	2.2	41
			SRS1914	36.0 X	19.7	3.75	8.8 - 30.6	0.44	3.2	41
			SRS1915	38.0 X	12.0	3.00	3.3 - 20.7	n/a	3.1	41
177 B - Hot Wat.	mg/kg		SRS1911	0.077	0.13	0.049	0.00 - 0.27	1.46	0.020	22
			SRS1912	0.98	1.59	0.31	0.67 - 2.50	1.08	0.15	24
			SRS1913	0.11	0.19	0.06	0.01 - 0.37	1.16	0.03	23
			SRS1914	0.10	0.17	0.06	0.01 - 0.34	0.13	0.05	22
			SRS1915	0.40	0.78	0.21	0.18 - 1.38	0.56	0.10	24



Agriculture Laboratory Proficiency (ALP) Program

Fall 2019

Performance Analysis Report - Test Cycle 40

CTS Lab Code: U6401A

Web Code: NP96FK for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
182 SOM - Walkley-Black	Percent		SRS1911	1.57	1.19	0.18	0.67 - 1.72	2.10	0.07	18
			SRS1912	2.07	1.93	0.09	1.66 - 2.19	2.39 X	0.05	18
			SRS1913	0.83	0.87	0.09	0.60 - 1.14	1.33	0.04	18
			SRS1914	2.37	1.89	0.17	1.40 - 2.38	1.37	0.11	18
			SRS1915	4.53	5.93	0.62	4.12 - 7.75	1.40	0.18	18
183 SOM - LOI (% Wt loss)	Percent		SRS1911	1.43	1.40	0.07	1.20 - 1.60	0.86	0.07	45
			SRS1912	2.80	2.76	0.24	2.07 - 3.46	0.00	0.11	45
			SRS1913	1.30	1.26	0.07	1.06 - 1.47	0.00	0.06	45
			SRS1914	2.60	2.52	0.08	2.28 - 2.76	0.00	0.10	45
			SRS1915	7.20	6.60	0.35	5.59 - 7.61	0.00	0.29	45
185 CaCO3 Content	Percent		SRS1911	0.83	0.44	0.24	0.00 - 1.14	2.34 X	0.05	7
			SRS1912	3.83 X	1.63	0.44	0.34 - 2.92	2.39 X	0.17	10
			SRS1913	0.67	0.42	0.12	0.07 - 0.77	1.65	0.13	7
			SRS1914	0.90	0.64	0.26	0.00 - 1.39	0.72	0.14	7
			SRS1915	6.63 X	4.16	0.53	2.62 - 5.69	1.34	0.19	13
186 CEC - Cation Displacement	cmol/kg		SRS1911	4.33 X	3.20	0.35	2.20 - 4.20	2.12 X	0.27	6
			SRS1912	31.0 X	24.4	1.66	19.6 - 29.2	0.62	1.6	6
			SRS1913	11.3 X	7.86	0.40	6.70 - 9.02	1.33	0.4	6
			SRS1914	13.7 X	8.06	0.32	7.13 - 8.99	1.67	0.3	6
			SRS1915	39.3	34.3	4.50	21.2 - 47.3	1.94 X	2.0	6
189 Sand 2000 - 50 um	Percent		SRS1911	78.3	78.4	2.13	72.2 - 84.6	0.49	1.2	26
			SRS1912	14.7	14.9	4.77	1.1 - 28.7	0.35	1.7	26
			SRS1913	58.0	55.9	2.51	48.6 - 63.2	n/a	1.1	26
			SRS1914	29.0	28.2	3.84	17.1 - 39.4	0.69	1.5	26
			SRS1915	35.7	34.0	3.10	25.0 - 43.0	0.37	1.6	26
190 Silt 50 - 2 um	Percent		SRS1911	18.0	15.0	2.74	7.0 - 22.9	0.98	1.0	26
			SRS1912	45.0	40.4	7.18	19.6 - 61.2	n/a	2.3	26
			SRS1913	32.7	30.8	3.18	21.5 - 40.0	0.20	2.9	26
			SRS1914	50.3	44.8	5.17	29.8 - 59.8	0.40	1.4	26
			SRS1915	36.7	34.5	4.90	20.3 - 48.7	0.33	1.8	26
191 Clay 2 - 0 um	Percent		SRS1911	3.67	6.15	2.32	0.00 - 12.89	0.66	0.88	26
			SRS1912	40.3	47.0	6.67	27.7 - 66.4	0.31	1.9	26
			SRS1913	9.33	14.0	2.16	7.7 - 20.3	0.23	2.49	26
			SRS1914	20.7	29.1	4.00	17.5 - 40.7	0.42	1.4	26
			SRS1915	27.7	33.1	3.40	23.2 - 42.9	0.31	1.9	26



Agriculture Laboratory Proficiency (ALP) Program

Performance Analysis Report - Test Cycle 40

CTS Lab Code: U6401A

Laboratory Performance Summary - Soil Properties

Performance Review of Laboratory-Sample Biases

z-scores calculated using Lab Median and mean average deviation
(numbers closer to zero indicate closer agreement with other laboratories and
scores outside limits in red)

Test Code	Analysis	SRS1911	SRS1912	SRS1913	SRS1914	SRS1915
101	Saturated Paste Moisture	1.00	0.68	1.97	0.87	2.16
102	pH - sp	-5.94	-0.89	-5.52	-2.92	-2.15
103	ECe - sp	-2.59	-6.10	-4.26	-1.86	-5.19
104	HCO ₃ -sp	0.35	-0.03	0.15	-0.25	-0.21
105	K - sp	-1.14	-1.63	-4.39	-2.67	-2.87
106	Ca - sp	-1.28	-2.68	-1.95	-2.37	-1.99
107	Mg - sp	-3.25	-1.92	-3.36	-2.61	-2.21
108	Na - sp	-1.09	-0.82	0.32	3.82	13.73
109	SAR - sp	0.42	0.27	3.45	10.47	19.17
111	SO ₄ - sp	-1.89	-0.99	1.58	13.24	-3.33
127	NO ₃ -N Cd. Rd.	1.78	4.58	4.73	6.71	2.55
131	NH ₄ - N (KCl Extr.)	0.11	-0.02	1.85	1.00	7.56
135	PO ₄ -P Olsen/Bicarb (1:20)	14.16	5.97	31.04	32.11	15.32
141	K Ammonium Acetate	-3.20	-1.96	-2.58	-1.96	1.81
142	Ca Ammonium Acetate	-0.35	0.82	-0.93	-0.15	1.32
143	Mg Ammonium Acetate	-1.78	-0.44	-1.36	-0.97	0.04
144	Na Ammonium Acetate	3.29	0.67	4.63	4.35	8.67
177	B - Hot Wat.	-1.03	-1.94	-1.27	-1.39	-1.86
182	SOM - Walkley-Black	2.07	1.53	-0.39	2.80	-2.24
183	SOM - LOI (% Wt loss)	0.48	0.15	0.52	0.92	1.71
185	CaCO ₃ Content	1.64	4.95	2.03	1.00	4.67
186	CEC - Cation Displacement	3.29	3.95	8.68	17.43	1.13
189	Sand 2000 - 50 um	-0.03	-0.05	0.84	0.20	0.54
190	Silt 50 - 2 um	1.10	0.64	0.60	1.07	0.44
191	Clay 2 - 0 um	-1.07	-1.01	-2.16	-2.10	-1.59

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Standard Reference Soils (SRS), materials used for the soils program were: SRS2020 a Seaton silt loam collected from Trempealeau Cty, WI; SRS2002 a Cibola silty clay loam collected from Riverside Cty, CA; SRS2003 a Lloyd clay loam collected from Rowan Cty, NC; SRS2004 a loam collected near Lethbridge, Alberta CANADA; and SRS2005 a Paxton fine sandy loam collected from Kennebec Cty, ME. Standard Reference Botanical (SRB) materials were: SRB2001 sudan grass composite from CA; SRB2002 tree leaf composite from NE; SRB2003 grape leaf composite from WA and SRB2004 jalapeno pepper composite from IA. Standard Reference Water (SRW) solutions represent agriculture water samples collected from: SRW2001 a well in NE, SRW2002 a river-fed canal in CA, and SRW2003 a river in central WA.

It is important to remember that all ALP Program evaluations are based on comparative and consensus statistics; users must be aware that small group statistics are inherently less robust than large group statistics, even though robust evaluations have been preferentially chosen. No comparative results are provided for analyses with fewer than 5 reported results. Results of all laboratories that reported for each property may be found in the web-based summary report posted on the CTS Web site.

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WithinLab Performance, k	The ratio (standard or z-score) of each laboratory standard deviation within each sample-property and the WithinLab Avg STD (see below). A score of 1 indicates that variation within a laboratory for that sample-property was the same as the average variation.
WithinLab Avg STD	The average (sum of squares) of the standard deviations of the triplicate determinations submitted for each sample-property.
Laboratory-Sample Bias (from summary page)	The ratio (standard or z-score) of each laboratory difference, between the Lab Mean and the Grand Median, and the M.A.D. A score of 0 indicates agreement of the laboratory with the consensus average.



Agriculture Laboratory Proficiency (ALP) Program

Spring 2020

Performance Analysis Report - Test Cycle 41

CTS Lab Code: U6401A

Web Code: DF8HMY for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
101	Saturated Paste Moisture	Percent	SRS2001	36.8	38.1	2.75	30.1 - 46.1	0.86	1.4	23
			SRS2002	40.6	40.2	3.13	31.1 - 49.3	1.13	1.1	23
			SRS2003	74.8	73.0	6.06	55.5 - 90.6	0.92	1.8	23
			SRS2004	51.3	45.8	4.40	33.0 - 58.6	1.12	1.4	23
			SRS2005	44.1	42.0	3.49	31.9 - 52.1	2.10	2.5	23
102	pH - sp	Unit	SRS2001	4.93	5.06	0.07	4.86 - 5.27	1.33	0.04	24
			SRS2002	7.57	7.57	0.11	7.26 - 7.88	2.65 X	0.04	24
			SRS2003	6.00	6.00	0.17	5.50 - 6.50	2.30 X	0.04	24
			SRS2004	7.70	7.66	0.09	7.41 - 7.90	1.89	0.05	24
			SRS2005	6.63	6.50	0.08	6.27 - 6.73	1.95	0.06	24
103	ECe - sp	dS/m	SRS2001	2.10	2.49	0.21	1.88 - 3.11	0.20	0.20	27
			SRS2002	3.77	4.07	0.32	3.14 - 5.00	0.36	0.21	27
			SRS2003	0.28	0.28	0.037	0.17 - 0.38	1.32	0.02	27
			SRS2004	0.74	0.75	0.06	0.58 - 0.91	1.37	0.03	27
			SRS2005	1.56 X	2.11	0.10	1.81 - 2.41	1.85	0.08	27
104	HCO ₃ -sp	mmolc/L	SRS2001	0.51	0.28	0.21	0.00 - 0.89	2.49 X	0.07	10
			SRS2002	4.27	4.39	0.65	2.50 - 6.28	0.00	0.43	10
			SRS2003	0.81	0.71	0.29	0.00 - 1.53	2.61 X	0.18	10
			SRS2004	6.51 X	4.57	0.55	2.97 - 6.17	2.76 X	0.26	10
			SRS2005	0.92	0.73	0.20	0.16 - 1.30	2.28 X	0.13	10
105	K - sp	mmolc/L	SRS2001	0.31	0.28	0.031	0.18 - 0.37	3.59 X	0.04	19
			SRS2002	0.83	0.85	0.08	0.63 - 1.08	0.99	0.05	19
			SRS2003	0.077	0.09	0.012	0.06 - 0.13	1.12	0.005	14
			SRS2004	0.93	1.12	0.15	0.69 - 1.56	0.56	0.05	19
			SRS2005	0.20	0.28	0.030	0.19 - 0.37	0.44	0.02	19
106	Ca - sp	mmolc/L	SRS2001	10.4	13.4	1.34	9.6 - 17.3	0.48	0.9	25
			SRS2002	19.9	20.0	1.87	14.6 - 25.4	1.26	1.0	25
			SRS2003	1.04	1.17	0.21	0.58 - 1.77	1.40	0.07	25
			SRS2004	4.85	5.31	0.66	3.40 - 7.21	1.36	0.19	25
			SRS2005	7.77 X	11.9	1.11	8.7 - 15.1	1.74	0.57	25
107	Mg - sp	mmolc/L	SRS2001	7.70	9.42	0.80	7.10 - 11.74	0.63	0.54	25
			SRS2002	9.56	9.55	0.93	6.85 - 12.25	1.16	0.49	25
			SRS2003	0.74	0.87	0.11	0.54 - 1.20	1.60	0.07	25
			SRS2004	1.61	1.63	0.17	1.15 - 2.12	0.72	0.09	25
			SRS2005	4.77 X	7.19	0.73	5.07 - 9.31	1.60	0.39	25
108	Na - sp	mmolc/L	SRS2001	0.53	0.53	0.040	0.41 - 0.65	0.87	0.07	25
			SRS2002	14.7	14.9	1.26	11.2 - 18.5	1.17	0.7	25
			SRS2003	0.28	0.20	0.046	0.07 - 0.33	3.21 X	0.06	23
			SRS2004	0.25	0.24	0.040	0.12 - 0.36	0.57	0.06	24
			SRS2005	0.21	0.24	0.041	0.13 - 0.36	0.52	0.07	24
109	SAR - sp	value	SRS2001	0.18	0.16	0.017	0.11 - 0.21	0.75	0.03	19
			SRS2002	3.82	3.93	0.12	3.60 - 4.27	1.39	0.08	19
			SRS2003	0.29 X	0.20	0.023	0.13 - 0.27	2.71 X	0.06	17
			SRS2004	0.14	0.13	0.015	0.09 - 0.18	0.29	0.03	19
			SRS2005	0.087	0.09	0.019	0.04 - 0.15	0.54	0.028	15



Agriculture Laboratory Proficiency (ALP) Program

Spring 2020

Performance Analysis Report - Test Cycle 41

CTS Lab Code: U6401A

Web Code: DF8HMY for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
110 Cl - sp	mmolc/L		SRS2001	0.31	0.25	0.026	0.18 - 0.33	2.91 X	0.06	18
			SRS2002	12.0	12.1	1.25	8.4 - 15.7	0.71	0.4	23
			SRS2003	0.37	0.33	0.06	0.15 - 0.51	0.66	0.04	22
			SRS2004	1.03	1.11	0.11	0.81 - 1.42	0.96	0.08	23
			SRS2005	0.32	0.40	0.09	0.15 - 0.65	0.11	0.13	21
111 SO4 - sp	mmolc/L		SRS2001	0.45	0.46	0.07	0.26 - 0.67	0.51	0.07	20
			SRS2002	17.2	19.0	1.81	13.8 - 24.3	0.69	0.7	21
			SRS2003	0.63	0.42	0.14	0.03 - 0.81	3.43 X	0.08	21
			SRS2004	0.58 X	0.87	0.09	0.62 - 1.12	1.98	0.07	21
			SRS2005	0.59	0.74	0.09	0.48 - 1.00	0.27	0.05	20
127 NO3-N Cd. Rd.	mg/kg		SRS2001	131.3	124.1	7.08	103.5 - 144.6	0.67	6.2	44
			SRS2002	80.7	71.4	5.11	56.5 - 86.2	0.66	3.4	44
			SRS2003	15.0 X	11.1	1.33	7.2 - 14.9	0.26	1.2	44
			SRS2004	16.5 X	13.2	1.00	10.3 - 16.1	0.08	0.7	44
			SRS2005	105.0	101.7	12.3	66.1 - 137.2	1.18	4.7	44
131 NH4 - N (KCl Extr.)	mg/kg		SRS2001	7.33	7.54	1.03	4.55 - 10.53	0.93	0.62	30
			SRS2002	13.0	13.3	1.64	8.5 - 18.1	n/a	0.5	30
			SRS2003	6.00	5.96	1.13	2.67 - 9.24	n/a	0.41	30
			SRS2004	18.0	18.0	1.44	13.9 - 22.2	n/a	0.8	30
			SRS2005	29.3	33.2	5.62	16.9 - 49.5	0.46	1.3	30
135 PO4-P Olsen/Bicarb (1:20)	mg/kg		SRS2001	19.3 X	8.77	1.14	5.45 - 12.08	3.49 X	0.7	42
			SRS2002	23.7	20.0	2.04	14.1 - 25.9	0.57	1.0	42
			SRS2003	8.67 X	3.33	1.00	0.43 - 6.23	1.01	0.57	41
			SRS2004	13.3 X	5.33	1.33	1.47 - 9.20	0.68	0.9	41
			SRS2005	26.3	20.4	3.00	11.7 - 29.1	0.55	1.0	41
141 K Ammonium Acetate	mg/kg		SRS2001	76.0	79.1	4.94	64.8 - 93.5	1.37	3.3	49
			SRS2002	264.0	240.3	10.00	211.3 - 269.3	0.99	9.1	50
			SRS2003	90.7	78.7	9.67	50.6 - 106.7	0.16	3.7	49
			SRS2004	522.3	459.3	36.0	354.9 - 563.6	0.80	12.5	50
			SRS2005	99.3	93.4	15.1	49.6 - 137.3	2.91 X	3.3	49
142 Ca Ammonium Acetate	mg/kg		SRS2001	1,120.0	1,050.2	58.2	881.5 - 1,218.9	1.82	27.5	48
			SRS2002	4,713.3	4,000.0	713.3	1,931.3 - 6,068.7	0.88	139.5	48
			SRS2003	1,180.0	1,079.0	116.0	742.6 - 1,415.4	0.90	40.2	48
			SRS2004	5,476.7	4,639.3	707.3	2,588.1 - 6,690.6	2.43 X	167.9	48
			SRS2005	1,693.3	1,360.5	215.8	734.6 - 1,986.4	2.01	48.3	48
143 Mg Ammonium Acetate	mg/kg		SRS2001	328.0	301.8	23.2	234.5 - 369.1	0.71	8.8	49
			SRS2002	544.7	479.1	32.3	385.5 - 572.8	0.45	18.4	49
			SRS2003	414.3	334.0	33.6	236.6 - 431.4	0.81	11.0	49
			SRS2004	493.0 X	394.6	31.1	304.4 - 484.8	1.38	11.4	49
			SRS2005	300.7	241.7	37.1	134.2 - 349.2	2.45 X	8.3	49
144 Na Ammonium Acetate	mg/kg		SRS2001	64.3 X	14.4	2.98	5.7 - 23.0	0.48	2.4	44
			SRS2002	335.3 X	274.8	14.5	232.9 - 316.8	0.50	12.9	45
			SRS2003	73.0 X	16.1	4.16	4.1 - 28.2	0.82	2.1	44
			SRS2004	110.0 X	12.9	3.62	2.4 - 23.4	0.99	5.3	44
			SRS2005	31.3 X	11.0	3.43	1.1 - 20.9	0.62	2.5	44



Agriculture Laboratory Proficiency (ALP) Program

Spring 2020

Performance Analysis Report - Test Cycle 41

CTS Lab Code: U6401A

Web Code: DF8HMY for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
177 B - Hot Wat.	mg/kg		SRS2001	0.18	0.31	0.05	0.15 - 0.46	0.15	0.04	22
			SRS2002	0.49	0.83	0.16	0.37 - 1.30	1.82	0.07	22
			SRS2003	0.26 X	0.68	0.12	0.33 - 1.03	0.09	0.06	22
			SRS2004	0.46 X	0.83	0.12	0.47 - 1.19	0.06	0.09	22
			SRS2005	0.12 X	0.30	0.041	0.18 - 0.42	0.43	0.04	21
179 Soil Kjeldahl N	Percent		SRS2001	0.09 X	0.12	0.004	0.11 - 0.13	1.46	0.00	13
			SRS2002	0.063	0.074	0.005	0.060 - 0.087	1.59	0.004	13
			SRS2003	0.083	0.078	0.008	0.054 - 0.102	3.32 X	0.010	13
			SRS2004	0.18 X	0.23	0.010	0.20 - 0.26	1.06	0.01	13
			SRS2005	0.19 X	0.25	0.010	0.22 - 0.28	0.00	0.01	13
182 SOM - Walkley-Black	Percent		SRS2001	1.97	1.99	0.18	1.48 - 2.51	2.17 X	0.07	16
			SRS2002	1.67 X	1.05	0.15	0.62 - 1.48	2.81 X	0.07	16
			SRS2003	2.23	1.68	0.27	0.90 - 2.46	2.98 X	0.08	16
			SRS2004	4.27	4.33	0.46	2.98 - 5.67	0.46	0.13	16
			SRS2005	5.20	5.19	0.25	4.47 - 5.92	1.74 X	0.15	16
183 SOM - LOI (% Wt loss)	Percent		SRS2001	3.83 X	2.66	0.09	2.41 - 2.91	5.26 X	0.09	46
			SRS2002	2.10 X	1.31	0.10	1.02 - 1.60	0.00	0.08	46
			SRS2003	8.30 X	3.64	0.15	3.21 - 4.07	1.65	0.10	46
			SRS2004	6.03 X	4.68	0.15	4.25 - 5.11	0.47	0.12	46
			SRS2005	7.23 X	6.28	0.17	5.79 - 6.77	1.53	0.15	46
185 CaCO3 Content	Percent		SRS2001	1.53	0.44	0.41	0.00 - 1.62	1.12	0.10	5
			SRS2002	8.97	7.92	1.28	4.22 - 11.63	0.80	0.14	10
			SRS2003	2.00	0.69	0.52	0.00 - 2.19	1.70	0.10	5
			SRS2004	5.63	4.72	0.86	2.22 - 7.22	0.77	0.20	10
			SRS2005	2.33 X	0.79	0.22	0.14 - 1.44	2.41 X	0.12	8
186 CEC - Cation Displacement	cmol/kg		SRS2001	14.3 X	9.91	0.83	7.49 - 12.32	2.77 X	0.4	9
			SRS2002	14.7	12.4	1.40	8.3 - 16.4	1.15	1.0	9
			SRS2003	21.7 X	13.4	2.22	7.0 - 19.8	0.64	0.9	9
			SRS2004	23.3	19.1	2.37	12.2 - 26.0	1.90 X	0.8	9
			SRS2005	20.3 X	13.4	1.30	9.6 - 17.2	0.91	0.6	9
189 Sand 2000 - 50 um	Percent		SRS2001	30.4 X	37.6	2.33	30.8 - 44.3	0.78	1.0	25
			SRS2002	46.3 X	51.4	1.74	46.4 - 56.5	0.89	1.4	25
			SRS2003	23.8	28.3	2.89	19.9 - 36.7	1.42	0.9	25
			SRS2004	46.3	49.7	2.83	41.5 - 57.9	0.91	1.4	25
			SRS2005	41.7	43.1	3.47	33.1 - 53.2	0.73	0.9	25
190 Silt 50 - 2 um	Percent		SRS2001	56.3	48.6	3.42	38.7 - 58.5	0.00	1.3	25
			SRS2002	32.1	26.2	2.57	18.8 - 33.7	0.36	1.9	25
			SRS2003	40.4	32.4	4.27	20.0 - 44.8	0.35	2.2	25
			SRS2004	27.1	26.0	3.57	15.7 - 36.3	0.45	1.6	25
			SRS2005	46.7	44.9	2.65	37.2 - 52.6	0.61	1.1	25
191 Clay 2 - 0 um	Percent		SRS2001	13.4	15.1	2.10	9.0 - 21.2	1.02	0.7	25
			SRS2002	21.7	22.3	2.67	14.6 - 30.1	0.75	0.9	25
			SRS2003	35.9	38.0	3.00	29.3 - 46.7	0.34	2.2	25
			SRS2004	26.7	24.2	2.83	15.9 - 32.4	0.64	1.1	25
			SRS2005	11.7	12.1	2.75	4.1 - 20.1	0.66	1.1	25



Agriculture Laboratory Proficiency (ALP) Program

Performance Analysis Report - Test Cycle 41

CTS Lab Code: U6401A

Laboratory Performance Summary - Soil Properties

Performance Review of Laboratory-Sample Biases

z-scores calculated using Lab Median and mean average deviation
(numbers closer to zero indicate closer agreement with other laboratories and
scores outside limits in red)

Test Code	Analysis	SRS2001	SRS2002	SRS2003	SRS2004	SRS2005
101	Saturated Paste Moisture	-0.47	0.12	0.29	1.24	0.60
102	pH - sp	-1.86	0.00	0.01	0.53	1.67
103	ECe - sp	-1.84	-0.95	0.00	-0.09	-5.30
104	HCO ₃ -sp	1.09	-0.18	0.38	3.52	0.96
105	K - sp	1.10	-0.30	-1.29	-1.30	-2.67
106	Ca - sp	-2.28	-0.03	-0.64	-0.69	-3.70
107	Mg - sp	-2.15	0.01	-1.18	-0.15	-3.31
108	Na - sp	0.00	-0.16	1.76	0.33	-0.81
109	SAR - sp	0.82	-0.94	4.00	0.44	-0.36
110	Cl - sp	2.30	-0.02	0.75	-0.80	-0.93
111	SO ₄ - sp	-0.20	-1.01	1.52	-3.36	-1.69
127	NO ₃ -N Cd. Rd.	1.02	1.82	2.93	3.28	0.27
131	NH ₄ - N (KCl Extr.)	-0.20	-0.19	0.04	-0.03	-0.68
135	PO ₄ -P Olsen/Bicarb (1:20)	9.24	1.79	5.33	6.00	1.97
141	K Ammonium Acetate	-0.63	2.37	1.24	1.75	0.39
142	Ca Ammonium Acetate	1.20	1.00	0.87	1.18	1.54
143	Mg Ammonium Acetate	1.13	2.03	2.39	3.16	1.59
144	Na Ammonium Acetate	16.78	4.19	13.69	26.81	5.93
177	B - Hot Wat.	-2.44	-2.13	-3.54	-3.04	-4.41
179	Soil Kjeldahl N	-6.85	-2.27	0.60	-5.00	-5.71
182	SOM - Walkley-Black	-0.15	4.17	2.07	-0.13	0.03
183	SOM - LOI (% Wt loss)	13.50	7.95	31.36	9.23	5.65
185	CaCO ₃ Content	2.69	0.82	2.53	1.06	6.89
186	CEC - Cation Displacement	5.32	1.64	3.73	1.79	5.34
189	Sand 2000 - 50 um	-3.06	-2.98	-1.58	-1.20	-0.41
190	Silt 50 - 2 um	2.24	2.29	1.88	0.31	0.69
191	Clay 2 - 0 um	-0.84	-0.24	-0.71	0.89	-0.15

*The ALP Program is operated by Collaborative Testing Services, Inc.
in cooperation with Robert O. Miller, PhD, Program Technical Director*



The Agriculture Laboratory Proficiency (ALP) Program Summer 2020 (Cycle 42) was completed in July and August 2020, with participation by 98 labs from the United States, Canada, Guatemala, South Africa, Italy, Ukraine, Romania and the Philippines. Proficiency samples consisted of five soils, four botanical and three water samples. Analytical methods evaluated are based on those published by AOAC, four regional soil work groups, the Soil Plant Analysis Council and Forestry Canada.

This Individual Performance Analysis report presents results that are particular to your laboratory. All properties and samples for which your laboratory reported results are presented in this report. An analysis of between and within laboratory performance for soil, botanicals, and water properties follows this page. A summary of results follows immediately after the analysis for each sample type. This summary condenses your between laboratory performance on a single page and may be the best place to start the review of your results.

Standard Reference Soils (SRS), materials used for the soils program were: SRS2006 a Marshall silty clay loam collected from Brown Cty, KS; SRS2007 a silty clay loam collected from Three Bridges, Ontario, CANADA; SRS2008 an Adrian muck collected from Porter Cty, IN; SRS2009 a Pulaski fine sandy loam collected near Payne Cty, OK; and SRS2010 a Newdale silt loam collected from Power Cty, ID. Standard Reference Botanical (SRB) materials were: SRB2005 arugula leaf composite from AZ; SRB2006 walnut leaf composite from CA; SRB2007 soybean leaf from AR and SRB2008 grass hay from NE. Standard Reference Water (SRW) solutions represent agriculture water samples collected from: SRW2004 a stream in IA, SRW2005 a well source in MN, and SRW2006 a canal in CO.

It is important to remember that all ALP Program evaluations are based on comparative and consensus statistics; users must be aware that small group statistics are inherently less robust than large group statistics, even though robust evaluations have been preferentially chosen. No comparative results are provided for analyses with fewer than 5 reported results. Results of all laboratories that reported for each property may be found in the web-based summary report posted on the CTS Web site.

Quick Key to your Performance Analysis Report

Lab Mean	The mean of the triplicate determinations submitted for each sample-property.
Grand Median	The median of all included Lab Means submitted for each sample-property.
MAD	The median of the differences (absolute values) between the Grand Median and the Lab Means.
95% Conf Interval	The estimated range of value which is likely to include the sample-property value, calculated from the Grand Median and the M.A.D.
WithinLab Performance, k	The ratio (standard or z-score) of each laboratory standard deviation within each sample-property and the WithinLab Avg STD (see below). A score of 1 indicates that variation within a laboratory for that sample-property was the same as the average variation.
WithinLab Avg STD	The average (sum of squares) of the standard deviations of the triplicate determinations submitted for each sample-property.
Laboratory-Sample Bias (from summary page)	The ratio (standard or z-score) of each laboratory difference, between the Lab Mean and the Grand Median, and the M.A.D. A score of 0 indicates agreement of the laboratory with the consensus average.



Agriculture Laboratory Proficiency (ALP) Program

Summer 2020

Performance Analysis Report - Test Cycle 42

CTS Lab Code: U6401A

Web Code: Z9RD3R for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
101 Saturated Paste Moisture	Percent		SRS2006	54.2	49.7	5.33	34.2 - 65.1	0.32	3.1	21
			SRS2007	52.8	50.4	3.85	39.2 - 61.6	1.11	1.6	21
			SRS2008	81.5	70.9	5.58	54.7 - 87.0	0.41	1.4	21
			SRS2009	30.8	29.3	2.13	23.1 - 35.5	0.65	1.5	21
			SRS2010	31.2	31.2	2.57	23.8 - 38.7	0.56	2.0	21
102 pH - sp	Unit		SRS2006	4.87	5.20	0.13	4.84 - 5.57	0.52	0.11	24
			SRS2007	6.60 X	6.94	0.10	6.65 - 7.23	0.00	0.05	24
			SRS2008	5.60	5.85	0.12	5.52 - 6.19	0.00	0.05	24
			SRS2009	4.50	4.71	0.09	4.44 - 4.98	n/a	0.07	24
			SRS2010	7.23	7.50	0.12	7.15 - 7.85	0.70	0.08	24
103 ECe - sp	dS/m		SRS2006	0.42	0.40	0.037	0.29 - 0.51	1.46	0.03	25
			SRS2007	1.57	1.95	0.15	1.51 - 2.40	0.99	0.07	25
			SRS2008	0.46	0.64	0.14	0.23 - 1.05	0.54	0.04	25
			SRS2009	2.28 X	2.88	0.18	2.37 - 3.39	0.93	0.13	25
			SRS2010	1.20 X	1.57	0.07	1.36 - 1.78	1.74	0.09	25
105 K - sp	mmolc/L		SRS2006	0.24 X	0.36	0.030	0.27 - 0.45	0.63	0.02	19
			SRS2007	0.087 X	0.17	0.018	0.12 - 0.22	0.80	0.014	19
			SRS2008	0.52 X	0.98	0.06	0.79 - 1.17	1.17	0.06	19
			SRS2009	0.52 X	0.84	0.07	0.64 - 1.04	1.22	0.03	19
			SRS2010	0.88 X	1.55	0.11	1.22 - 1.87	1.03	0.11	19
106 Ca - sp	mmolc/L		SRS2006	1.94	2.17	0.22	1.54 - 2.80	0.74	0.17	24
			SRS2007	10.9	14.8	1.37	10.8 - 18.8	2.27 X	0.6	24
			SRS2008	2.20	3.22	0.49	1.80 - 4.64	1.04	0.15	24
			SRS2009	16.5	20.1	2.70	12.3 - 28.0	1.38	0.9	24
			SRS2010	7.35	9.95	1.23	6.38 - 13.52	1.20	0.59	24
107 Mg - sp	mmolc/L		SRS2006	0.84	0.80	0.050	0.66 - 0.94	1.27	0.07	24
			SRS2007	3.64	4.81	0.51	3.33 - 6.29	0.85	0.19	24
			SRS2008	1.46	2.23	0.45	0.93 - 3.53	0.74	0.11	24
			SRS2009	2.59	3.31	0.32	2.37 - 4.25	0.71	0.17	24
			SRS2010	2.42 X	3.36	0.31	2.45 - 4.27	1.28	0.19	24
108 Na - sp	mmolc/L		SRS2006	0.59 X	0.18	0.035	0.08 - 0.28	12.97 X	0.03	21
			SRS2007	0.59 X	0.16	0.021	0.10 - 0.22	18.75 X	0.02	20
			SRS2008	0.38 X	0.18	0.029	0.10 - 0.26	3.24 X	0.04	22
			SRS2009	0.66 X	0.31	0.07	0.12 - 0.50	3.01 X	0.10	21
			SRS2010	1.46	1.78	0.15	1.33 - 2.22	1.27	0.11	24
109 SAR - sp	value		SRS2006	0.50 X	0.17	0.037	0.06 - 0.27	3.53 X	0.08	16
			SRS2007	0.22 X	0.059	0.011	0.026 - 0.092	3.26 X	0.05	14
			SRS2008	0.28 X	0.10	0.010	0.07 - 0.13	6.13 X	0.02	16
			SRS2009	0.22 X	0.10	0.020	0.04 - 0.16	3.02 X	0.03	14
			SRS2010	0.66	0.70	0.043	0.58 - 0.83	1.23	0.03	19
127 NO3-N Cd. Rd.	mg/kg		SRS2006	18.0	15.4	1.05	12.3 - 18.4	0.19	0.8	45
			SRS2007	112.0	96.3	6.03	78.8 - 113.8	0.83	4.4	45
			SRS2008	44.0 X	32.9	2.89	24.5 - 41.2	0.13	1.9	45
			SRS2009	127.7 X	110.5	4.82	96.5 - 124.5	1.46	5.6	45
			SRS2010	47.0 X	39.9	2.12	33.7 - 46.0	0.30	2.1	45



Agriculture Laboratory Proficiency (ALP) Program

Summer 2020

Performance Analysis Report - Test Cycle 42

CTS Lab Code: U6401A

Web Code: Z9RD3R for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
131 NH ₄ - N (KCl Extr.)	mg/kg		SRS2006	31.0 X	16.5	0.94	13.7 - 19.2	1.54	0.7	31
			SRS2007	13.0 X	2.46	0.99	0.00 - 5.32	n/a	0.3	30
			SRS2008	16.0 X	3.15	0.63	1.32 - 4.97	n/a	0.4	31
			SRS2009	22.0 X	7.89	0.58	6.20 - 9.59	n/a	0.4	31
			SRS2010	26.7 X	11.9	1.10	8.7 - 15.1	1.26	0.5	31
135 PO ₄ -P Olsen/Bicarb (1:20)	mg/kg		SRS2006	15.3 X	6.77	0.93	4.06 - 9.47	1.92	0.8	36
			SRS2007	9.67	9.33	0.93	6.63 - 12.04	0.95	0.61	35
			SRS2008	19.0 X	12.5	1.78	7.3 - 17.7	0.82	1.2	35
			SRS2009	15.7 X	8.11	0.89	5.55 - 10.68	1.00	0.6	35
			SRS2010	26.0	22.3	2.27	15.8 - 28.9	0.89	1.1	35
141 K Ammonium Acetate	mg/kg		SRS2006	249.3	289.5	20.5	230.0 - 349.1	0.10	21.6	45
			SRS2007	56.7	70.8	6.49	52.0 - 89.7	0.12	4.9	44
			SRS2008	544.7	544.7	61.7	365.7 - 723.8	0.28	33.4	45
			SRS2009	46.7 X	64.0	4.00	52.4 - 75.6	0.10	5.6	44
			SRS2010	373.0	441.2	24.2	371.2 - 511.3	0.06	34.8	45
142 Ca Ammonium Acetate	mg/kg		SRS2006	2,390.0	2,313.3	130.3	1,935.4 - 2,691.2	0.45	140.1	43
			SRS2007	3,820.0	3,502.9	284.8	2,677.0 - 4,328.9	0.09	212.7	43
			SRS2008	4,813.3	4,287.0	446.2	2,993.1 - 5,580.9	0.17	244.7	43
			SRS2009	450.3	517.5	40.8	399.3 - 635.7	0.24	24.1	43
			SRS2010	3,256.7	3,192.7	429.4	1,947.5 - 4,438.0	0.20	275.0	43
143 Mg Ammonium Acetate	mg/kg		SRS2006	313.7	305.3	20.2	246.9 - 363.8	0.48	19.5	43
			SRS2007	374.0	356.4	21.0	295.5 - 417.2	0.32	21.8	43
			SRS2008	986.7	850.3	75.5	631.3 - 1,069.4	0.39	50.7	43
			SRS2009	31.7	40.8	4.89	26.6 - 55.0	0.25	4.5	42
			SRS2010	245.7	258.3	18.3	205.3 - 311.3	0.10	20.5	43
144 Na Ammonium Acetate	mg/kg		SRS2006	56.7 X	13.2	2.17	6.9 - 19.5	1.25	1.8	38
			SRS2007	49.0 X	9.16	1.70	4.24 - 14.08	5.33 X	1.2	38
			SRS2008	60.7 X	14.8	2.05	8.8 - 20.7	2.72 X	1.1	38
			SRS2009	51.7 X	8.36	2.63	0.72 - 15.99	8.87 X	1.0	38
			SRS2010	75.0 X	37.6	2.77	29.6 - 45.7	2.86 X	1.8	38
170 Zn - DTPA	mg/kg		SRS2006	0.93	1.23	0.14	0.83 - 1.62	0.10	0.10	41
			SRS2007	0.78	1.04	0.18	0.51 - 1.56	0.25	0.12	41
			SRS2008	14.3	19.3	3.34	9.6 - 29.0	0.22	0.9	41
			SRS2009	3.01	3.17	0.26	2.41 - 3.92	1.04	0.14	41
			SRS2010	1.22	1.40	0.13	1.01 - 1.79	0.19	0.13	41
171 Mn - DTPA	mg/kg		SRS2006	60.9	62.2	8.38	37.8 - 86.5	0.22	3.1	38
			SRS2007	0.83	0.90	0.30	0.03 - 1.77	0.58	0.19	38
			SRS2008	1.63 X	7.63	1.60	2.98 - 12.28	0.03	0.64	38
			SRS2009	59.2	64.7	6.57	45.6 - 83.7	0.09	3.4	38
			SRS2010	3.76	3.71	0.91	1.07 - 6.36	0.11	0.45	38
172 Fe - DTPA	mg/kg		SRS2006	39.5	48.0	8.33	23.8 - 72.2	0.02	2.6	40
			SRS2007	30.6	39.8	9.21	13.1 - 66.5	0.26	3.0	40
			SRS2008	395.0	446.3	41.4	326.3 - 566.3	0.39	18.6	40
			SRS2009	36.8	45.3	5.67	28.9 - 61.8	0.49	3.9	40
			SRS2010	2.09	2.70	0.63	0.87 - 4.53	0.13	0.47	40



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
173 Cu - DTPA	mg/kg		SRS2006	0.73	0.98	0.09	0.72 - 1.23	0.26	0.06	39
			SRS2007	0.47	0.68	0.17	0.20 - 1.16	0.50	0.05	39
			SRS2008	0.69	1.24	0.22	0.61 - 1.87	0.17	0.09	39
			SRS2009	0.24	0.29	0.041	0.17 - 0.41	0.65	0.04	39
			SRS2010	0.47	0.60	0.07	0.39 - 0.81	0.35	0.04	39
177 B - Hot Wat.	mg/kg		SRS2006	0.19	0.46	0.14	0.06 - 0.86	0.41	0.07	21
			SRS2007	0.26 X	0.67	0.11	0.36 - 0.99	0.39	0.08	21
			SRS2008	0.30	0.65	0.25	0.00 - 1.38	1.40	0.07	21
			SRS2009	0.053	0.15	0.05	0.01 - 0.30	0.08	0.076	20
			SRS2010	0.42	0.72	0.18	0.19 - 1.26	0.55	0.05	21
182 SOM - Walkley-Black	Percent		SRS2006	3.00	2.88	0.26	2.14 - 3.62	0.47	0.21	16
			SRS2007	4.47 X	7.38	0.44	6.09 - 8.66	1.03	0.31	16
			SRS2008	13.9	22.2	3.99	10.6 - 33.8	2.33 X	0.6	15
			SRS2009	0.87	0.78	0.12	0.43 - 1.12	0.79	0.07	16
			SRS2010	1.80	1.51	0.11	1.18 - 1.84	0.00	0.12	16
183 SOM - LOI (% Wt loss)	Percent		SRS2006	4.40 X	3.85	0.16	3.40 - 4.29	0.00	0.08	45
			SRS2007	8.70 X	7.63	0.25	6.92 - 8.34	0.00	0.15	45
			SRS2008	24.0	21.1	1.10	17.9 - 24.3	0.27	0.4	45
			SRS2009	1.10	0.98	0.06	0.82 - 1.14	0.00	0.06	45
			SRS2010	2.00	1.81	0.10	1.53 - 2.09	n/a	0.07	45
185 CaCO3 Content	Percent		SRS2006	0.10	0.43	n/a	n/a	0.00	0.12	4
			SRS2007	1.27	1.27	0.26	0.51 - 2.02	0.60	0.10	7
			SRS2008	1.27	1.30	0.64	0.00 - 3.15	1.04	0.11	6
			SRS2009	0.10	0.13	n/a	n/a	0.00	0.10	4
			SRS2010	2.77	2.35	0.71	0.30 - 4.41	0.52	0.11	9
186 CEC - Cation Displacement	cmol/kg		SRS2006	29.3 X	20.2	1.03	17.2 - 23.2	1.52	0.8	8
			SRS2007	26.7	23.7	2.00	17.9 - 29.5	1.83 X	1.1	8
			SRS2008	59.7	50.5	6.80	30.8 - 70.2	1.33	1.1	8
			SRS2009	3.67	3.48	0.19	2.93 - 4.03	2.02 X	0.29	8
			SRS2010	12.7 X	10.7	0.48	9.3 - 12.1	1.51	0.8	8
189 Sand 2000 - 50 um	Percent		SRS2006	11.7	14.9	3.67	4.2 - 25.5	0.44	1.6	28
			SRS2007	43.8	46.7	3.33	37.0 - 56.3	0.00	1.5	28
			SRS2008	52.1	55.3	3.33	45.7 - 65.0	0.46	1.5	28
			SRS2009	38.4	42.3	5.28	27.0 - 57.6	0.28	2.7	28
			SRS2010	52.5	55.9	3.05	47.0 - 64.7	0.59	2.1	28
190 Silt 50 - 2 um	Percent		SRS2006	58.4	53.7	4.89	39.5 - 67.9	0.43	1.8	28
			SRS2007	41.3	39.1	2.38	32.2 - 46.0	0.00	1.9	28
			SRS2008	33.8	32.7	2.48	25.4 - 39.9	0.75	1.7	28
			SRS2009	54.2	51.2	3.83	40.1 - 62.3	0.28	2.5	28
			SRS2010	35.0	34.8	3.19	25.5 - 44.0	0.34	3.7	28
191 Clay 2 - 0 um	Percent		SRS2006	30.0	30.9	3.25	21.5 - 40.3	n/a	1.0	28
			SRS2007	15.0	15.0	3.37	5.2 - 24.8	n/a	1.0	28
			SRS2008	14.2	12.0	3.30	2.4 - 21.5	1.25	1.2	28
			SRS2009	7.50	7.50	2.25	0.97 - 14.03	n/a	1.39	28
			SRS2010	12.5	10.5	2.24	4.0 - 17.0	n/a	2.4	28



Agriculture Laboratory Proficiency (ALP) Program

Performance Analysis Report - Test Cycle 42

CTS Lab Code: U6401A

Laboratory Performance Summary - Soil Properties

Performance Review of Laboratory-Sample Biases

z-scores calculated using Lab Median and mean average deviation
(numbers closer to zero indicate closer agreement with other laboratories and
scores outside limits in red)

Test Code	Analysis	SRS2006	SRS2007	SRS2008	SRS2009	SRS2010
101	Saturated Paste Moisture	0.86	0.61	1.90	0.70	0.00
102	pH - sp	-2.66	-3.43	-2.17	-2.21	-2.22
103	ECe - sp	0.45	-2.53	-1.28	-3.44	-5.04
105	K - sp	-4.17	-4.50	-7.03	-4.65	-5.99
106	Ca - sp	-1.08	-2.85	-2.08	-1.36	-2.11
107	Mg - sp	0.87	-2.28	-1.71	-2.22	-3.01
108	Na - sp	11.82	19.99	6.81	5.49	-2.09
109	SAR - sp	9.26	14.53	18.00	6.00	-1.00
127	NO3-N Cd. Rd.	2.55	2.60	3.84	3.56	3.38
131	NH4 - N (KCl Extr.)	15.43	10.68	20.40	24.18	13.39
135	PO4-P Olsen/Bicarb (1:20)	9.18	0.36	3.64	8.53	1.62
141	K Ammonium Acetate	-1.96	-2.19	0.00	-4.33	-2.82
142	Ca Ammonium Acetate	0.59	1.11	1.18	-1.65	0.15
143	Mg Ammonium Acetate	0.41	0.84	1.80	-1.86	-0.69
144	Na Ammonium Acetate	20.08	23.49	22.37	16.45	13.51
170	Zn - DTPA	-2.16	-1.44	-1.51	-0.59	-1.37
171	Mn - DTPA	-0.15	-0.24	-3.74	-0.84	0.05
172	Fe - DTPA	-1.02	-1.00	-1.24	-1.51	-0.96
173	Cu - DTPA	-2.74	-1.26	-2.54	-1.15	-1.82
177	B - Hot Wat.	-1.95	-3.80	-1.39	-1.97	-1.68
182	SOM - Walkley-Black	0.45	-6.56	-2.09	0.75	2.53
183	SOM - LOI (% Wt loss)	3.58	4.35	2.64	2.12	1.93
185	CaCO3 Content		0.00	-0.06		0.58
186	CEC - Cation Displacement	8.83	1.47	1.35	0.97	4.03
189	Sand 2000 - 50 um	-0.86	-0.86	-0.97	-0.74	-1.09
190	Silt 50 - 2 um	0.96	0.94	0.45	0.79	0.09
191	Clay 2 - 0 um	-0.28	0.00	0.67	0.00	0.89

*The ALP Program is operated by Collaborative Testing Services, Inc.
in cooperation with Robert O. Miller, PhD, Program Technical Director*



The Agriculture Laboratory Proficiency (ALP) Program Fall 2018 (Cycle 37) was completed in November 2018, with participation by 104 labs from the United States, Canada, Guatemala, Honduras, South Africa, Italy, Ukraine, and the Philippines. Proficiency samples consisted of five soils, four botanical and three water samples. Analytical methods evaluated are based on those published by AOAC, four regional soil work groups, the Soil Plant Analysis Council and Forestry Canada.

This Individual Performance Analysis report presents results that are particular to your laboratory. All properties and samples for which your laboratory reported results are presented in this report. An analysis of between and within laboratory performance for soil, botanicals, and water properties follows this page. A summary of results follows immediately after the analysis for each sample type. This summary condenses your between laboratory performance on a single page and may be the best place to start the review of your results.

Standard Reference Soils (SRS), materials used for the soils program were: SRS1811 a Cookport-Nallen complex silt loam collected from Raleigh, WV; SRS1812 a clay collected from near Division #2 Lethbridge, AB, CANADA; SRS1813 a Cecil clay loam collected from Anderson Cty, SC; SRS1814 a Brownnton silty clay loam collected from Wright Cty, IA; and SRS1815 a Stayton silt loam collected from Marion Cty, OR. Standard Reference Botanical (SRB) materials were: SRB1809 hay silage from MN; SRB1810 box elder leaf composite; SRB1811 tall fescue leaf composite from ID and SRB1812 grape leaf composite from CA. Standard Reference Water (SRW) solutions represent agriculture water samples collected from: SRW1807 a source in OR, SRW1808 irrigation canal in CO, and SRW1809 a well in CO.

It is important to remember that all ALP Program evaluations are based on comparative and consensus statistics; users must be aware that small group statistics are inherently less robust than large group statistics, even though robust evaluations have been preferentially chosen. No comparative results are provided for analyses with fewer than 5 reported results. Results of all laboratories that reported for each property may be found in the web-based summary report posted on the CTS Web site.

Quick Key to your Performance Analysis Report

Lab Mean	The mean of the triplicate determinations submitted for each sample-property.
Grand Median	The median of all included Lab Means submitted for each sample-property.
MAD	The median of the differences (absolute values) between the Grand Median and the Lab Means.
95% Conf Interval	The estimated range of value which is likely to include the sample-property value, calculated from the Grand Median and the M.A.D.
WithinLab Performance, k	The ratio (standard or z-score) of each laboratory standard deviation within each sample-property and the WithinLab Avg STD (see below). A score of 1 indicates that variation within a laboratory for that sample-property was the same as the average variation.
WithinLab Avg STD	The average (sum of squares) of the standard deviations of the triplicate determinations submitted for each sample-property.
Laboratory-Sample Bias (from summary page)	The ratio (standard or z-score) of each laboratory difference, between the Lab Mean and the Grand Median, and the M.A.D. A score of 0 indicates agreement of the laboratory with the consensus average.



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
101	Saturated Paste Moisture	Percent	SRS1811	62.8	58.3	2.90	49.9 - 66.7	1.02	1.8	22
			SRS1812	66.0	57.3	4.80	43.4 - 71.3	0.83	1.7	22
			SRS1813	43.1	42.7	4.90	28.5 - 56.9	0.96	1.3	22
			SRS1814	63.2	53.4	3.42	43.5 - 63.3	0.85	1.4	22
			SRS1815	67.8	60.1	3.53	49.8 - 70.3	0.80	1.2	22
102	pH - sp	Unit	SRS1811	5.97	5.97	0.07	5.76 - 6.17	0.98	0.06	22
			SRS1812	6.97	6.97	0.06	6.80 - 7.13	0.71	0.08	22
			SRS1813	5.10	5.20	0.08	4.98 - 5.42	0.00	0.06	22
			SRS1814	5.83	5.82	0.11	5.50 - 6.14	1.14	0.05	22
			SRS1815	5.50	5.59	0.11	5.27 - 5.92	n/a	0.07	22
103	ECe - sp	dS/m	SRS1811	0.48	0.51	0.049	0.37 - 0.66	0.88	0.02	25
			SRS1812	0.75	0.88	0.08	0.64 - 1.12	0.67	0.04	25
			SRS1813	0.47	0.50	0.031	0.41 - 0.59	0.70	0.02	25
			SRS1814	1.82 X	2.18	0.12	1.83 - 2.53	1.17	0.09	25
			SRS1815	0.15	0.16	0.017	0.11 - 0.21	1.95	0.01	25
104	HCO ₃ -sp	mmolc/L	SRS1811	3.76	2.45	0.62	0.66 - 4.24	0.73	0.29	8
			SRS1812	5.82	5.22	1.02	2.27 - 8.17	0.63	0.27	8
			SRS1813	0.30	0.34	0.08	0.10 - 0.58	0.00	0.03	7
			SRS1814	1.10	1.06	0.26	0.30 - 1.82	1.81 X	0.19	8
			SRS1815	1.00	0.80	0.23	0.12 - 1.47	1.57	0.11	8
105	K - sp	mmolc/L	SRS1811	0.15	0.15	0.016	0.10 - 0.20	1.57	0.01	17
			SRS1812	0.29	0.34	0.037	0.23 - 0.45	1.59	0.03	17
			SRS1813	0.94	1.04	0.040	0.92 - 1.15	1.74 X	0.06	17
			SRS1814	0.59	0.68	0.06	0.50 - 0.87	0.73	0.04	17
			SRS1815	0.050	0.085	0.023	0.018 - 0.152	0.00	0.007	11
106	Ca - sp	mmolc/L	SRS1811	2.38	2.47	0.41	1.29 - 3.64	0.91	0.13	22
			SRS1812	4.34	5.21	0.69	3.21 - 7.20	1.39	0.38	22
			SRS1813	1.05	1.27	0.15	0.82 - 1.71	0.24	0.13	22
			SRS1814	11.0	13.7	1.07	10.6 - 16.8	1.23	0.7	22
			SRS1815	0.64	0.83	0.17	0.33 - 1.33	0.39	0.09	22
107	Mg - sp	mmolc/L	SRS1811	1.47	1.55	0.19	1.01 - 2.09	1.34	0.09	22
			SRS1812	2.31	2.93	0.24	2.25 - 3.62	1.45	0.22	22
			SRS1813	1.07	1.23	0.10	0.94 - 1.52	0.25	0.07	22
			SRS1814	4.33 X	5.61	0.30	4.74 - 6.48	1.22	0.24	22
			SRS1815	0.27	0.35	0.06	0.17 - 0.53	0.15	0.04	18
108	Na - sp	mmolc/L	SRS1811	0.58	0.49	0.08	0.27 - 0.71	0.95	0.15	22
			SRS1812	0.98	0.99	0.05	0.83 - 1.14	1.00	0.12	22
			SRS1813	0.28	0.24	0.027	0.17 - 0.32	1.07	0.10	21
			SRS1814	0.49	0.49	0.042	0.37 - 0.62	0.29	0.09	22
			SRS1815	0.18	0.23	0.022	0.17 - 0.30	0.26	0.07	21
109	SAR - sp	value	SRS1811	0.42 X	0.33	0.029	0.25 - 0.41	1.52	0.06	16
			SRS1812	0.53	0.51	0.040	0.39 - 0.62	1.24	0.04	17
			SRS1813	0.27	0.22	0.023	0.15 - 0.28	1.54	0.07	16
			SRS1814	0.18	0.16	0.013	0.12 - 0.20	0.42	0.02	16
			SRS1815	0.27	0.30	0.06	0.13 - 0.46	0.34	0.06	16



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
110	Cl - sp	mmolc/L	SRS1811	0.74	0.87	0.11	0.56 - 1.18	0.19	0.08	24
			SRS1812	1.01	1.13	0.12	0.78 - 1.48	0.69	0.10	24
			SRS1813	0.25	0.25	0.049	0.11 - 0.39	0.96	0.03	21
			SRS1814	0.41	0.48	0.05	0.32 - 0.64	0.41	0.04	20
			SRS1815	0.28	0.35	0.033	0.25 - 0.44	0.20	0.03	21
111	SO4 - sp	mmolc/L	SRS1811	0.58	0.68	0.10	0.38 - 0.98	2.65 X	0.09	21
			SRS1812	1.28 X	1.71	0.13	1.32 - 2.10	1.38	0.15	21
			SRS1813	0.57	0.59	0.022	0.52 - 0.65	1.71	0.06	21
			SRS1814	0.93 X	1.42	0.14	1.00 - 1.83	0.32	0.19	20
			SRS1815	0.17	0.24	0.049	0.10 - 0.38	1.40	0.05	21
135	PO4-P Olsen/Bicarb (1:20)	mg/kg	SRS1811	24.3 X	7.69	1.10	4.52 - 10.87	1.63	0.7	38
			SRS1812	27.3 X	11.4	0.91	8.8 - 14.1	3.24 X	0.8	38
			SRS1813	19.3	16.3	1.45	12.1 - 20.5	0.59	1.0	38
			SRS1814	79.0 X	42.1	2.89	33.7 - 50.5	1.03	1.7	38
			SRS1815	31.7 X	6.83	1.17	3.45 - 10.22	2.42 X	0.9	38
141	K Ammonium Acetate	mg/kg	SRS1811	108.7	90.8	14.7	48.3 - 133.3	0.21	2.7	48
			SRS1812	477.0 X	426.2	16.5	378.4 - 474.0	0.09	30.8	49
			SRS1813	270.0	277.5	10.3	247.6 - 307.4	0.33	25.9	49
			SRS1814	379.0	318.3	27.3	239.1 - 397.6	0.42	26.5	49
			SRS1815	121.3	106.4	12.5	70.1 - 142.8	0.75	5.0	49
142	Ca Ammonium Acetate	mg/kg	SRS1811	1,386.7	1,174.3	188.1	628.8 - 1,719.8	0.52	40.1	47
			SRS1812	5,466.7	4,329.3	417.3	3,119.1 - 5,539.6	0.35	156.8	47
			SRS1813	242.7	283.3	30.3	195.4 - 371.3	0.27	18.5	47
			SRS1814	4,896.7	4,114.1	304.4	3,231.5 - 4,996.7	0.95	137.5	47
			SRS1815	1,460.0	1,205.9	154.0	759.3 - 1,652.5	1.36	46.0	47
143	Mg Ammonium Acetate	mg/kg	SRS1811	267.0	230.0	39.6	115.1 - 345.0	0.38	7.8	47
			SRS1812	983.3	923.0	55.0	763.5 - 1,082.5	0.21	42.0	47
			SRS1813	96.3	111.5	10.7	80.4 - 142.6	0.07	8.8	47
			SRS1814	757.7	675.4	49.4	532.3 - 818.6	0.53	35.0	47
			SRS1815	202.0	172.5	23.3	104.9 - 240.1	1.10	7.8	47
144	Na Ammonium Acetate	mg/kg	SRS1811	24.7	20.6	2.76	12.6 - 28.6	4.27 X	2.0	41
			SRS1812	50.7	49.9	5.04	35.3 - 64.6	0.96	3.6	41
			SRS1813	22.3 X	11.7	3.00	3.0 - 20.4	2.31 X	1.7	40
			SRS1814	32.3 X	19.9	1.64	15.2 - 24.7	2.98 X	3.2	40
			SRS1815	21.0	18.8	2.27	12.2 - 25.4	2.91 X	2.9	41
170	Zn - DTPA	mg/kg	SRS1811	1.22	0.94	0.12	0.60 - 1.29	0.81	0.07	42
			SRS1812	0.96	0.85	0.08	0.63 - 1.07	0.00	0.04	42
			SRS1813	0.81 X	0.54	0.08	0.31 - 0.77	0.16	0.04	42
			SRS1814	2.65 X	1.93	0.20	1.36 - 2.51	1.54	0.07	42
			SRS1815	2.21 X	1.33	0.12	0.97 - 1.69	0.93	0.08	42
171	Mn - DTPA	mg/kg	SRS1811	47.3	47.5	10.0	18.5 - 76.6	0.77	2.9	36
			SRS1812	63.4	63.2	2.46	56.1 - 70.3	0.45	4.6	36
			SRS1813	13.1	12.5	0.99	9.6 - 15.4	0.25	0.9	36
			SRS1814	74.1	66.4	7.66	44.2 - 88.6	0.41	3.8	36
			SRS1815	15.5	12.2	1.45	8.0 - 16.4	0.45	0.8	36



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
172 Fe - DTPA		mg/kg	SRS1811	101.7 X	55.8	6.67	36.5 - 75.2	0.28	5.4	38
			SRS1812	8.68 X	22.6	2.64	15.0 - 30.3	0.19	2.08	38
			SRS1813	30.4 X	11.7	2.28	5.1 - 18.3	4.35 X	1.3	38
			SRS1814	58.0	68.0	6.51	49.1 - 86.8	0.37	3.6	38
			SRS1815	301.7 X	122.6	15.7	77.1 - 168.1	2.27 X	6.5	38
173 Cu - DTPA		mg/kg	SRS1811	0.66	0.55	0.10	0.25 - 0.85	0.85	0.04	38
			SRS1812	2.28	2.17	0.15	1.72 - 2.61	0.29	0.09	38
			SRS1813	0.77 X	0.48	0.09	0.21 - 0.74	0.26	0.04	38
			SRS1814	1.76 X	1.33	0.14	0.92 - 1.74	0.74	0.06	38
			SRS1815	1.24 X	0.81	0.10	0.51 - 1.11	0.38	0.09	38
182 SOM - Walkley-Black		Percent	SRS1811	6.23	5.43	0.34	4.43 - 6.43	3.49 X	0.23	20
			SRS1812	3.90	3.39	0.22	2.76 - 4.02	0.94	0.11	20
			SRS1813	2.73 X	1.83	0.16	1.37 - 2.29	1.70	0.09	20
			SRS1814	2.37 X	5.50	0.39	4.37 - 6.63	0.34	0.17	20
			SRS1815	7.80	7.97	0.19	7.42 - 8.53	2.82 X	0.27	19
183 SOM - LOI (% Wt loss)		Percent	SRS1811	6.70 X	6.04	0.21	5.44 - 6.64	0.00	0.10	48
			SRS1812	4.53	4.17	0.24	3.47 - 4.87	0.50	0.11	48
			SRS1813	7.27	6.94	0.23	6.27 - 7.62	0.51	0.11	48
			SRS1814	6.87	6.11	0.28	5.30 - 6.93	0.83	0.14	48
			SRS1815	11.3	10.4	0.33	9.4 - 11.4	0.45	0.2	48
185 CaCO3 Content		Percent	SRS1811	0.10	0.34	0.24	0.00 - 1.05	0.94	0.05	6
			SRS1812	1.58	1.42	0.18	0.90 - 1.95	0.31	0.09	8
			SRS1813	0.18	0.24	0.05	0.08 - 0.40	0.05	0.11	5
			SRS1814	1.02	0.75	0.36	0.00 - 1.79	0.53	0.05	8
			SRS1815	0.33	0.56	0.23	0.00 - 1.22	2.45 X	0.08	7
186 CEC - Cation Displacement		cmol/kg	SRS1811	19.7	14.9	2.13	8.7 - 21.0	0.83	0.7	8
			SRS1812	36.3	30.2	3.59	19.8 - 40.6	1.10	2.1	8
			SRS1813	13.0 X	7.08	1.66	2.27 - 11.90	n/a	0.7	8
			SRS1814	39.7	32.3	2.68	24.6 - 40.1	1.29	1.2	8
			SRS1815	36.0 X	21.2	2.68	13.4 - 28.9	2.12 X	2.1	8
189 Sand 2000 - 50 um		Percent	SRS1811	24.0	24.1	2.27	17.5 - 30.6	n/a	1.8	31
			SRS1812	26.0	26.7	2.37	19.8 - 33.5	n/a	1.6	31
			SRS1813	42.7	42.7	1.67	37.8 - 47.5	0.76	1.5	31
			SRS1814	33.0	33.7	2.84	25.4 - 41.9	0.75	1.3	31
			SRS1815	28.7	31.0	2.67	23.3 - 38.7	0.33	1.7	31
190 Silt 50 - 2 um		Percent	SRS1811	56.7	54.6	3.83	43.4 - 65.7	0.35	1.7	31
			SRS1812	33.0	27.8	4.50	14.8 - 40.9	n/a	1.4	31
			SRS1813	19.3	16.3	2.60	8.8 - 23.9	0.75	1.5	31
			SRS1814	34.0	30.8	3.56	20.5 - 41.1	0.98	1.0	31
			SRS1815	43.7	43.3	3.76	32.4 - 54.2	0.90	1.3	31
191 Clay 2 - 0 um		Percent	SRS1811	19.3	23.8	4.41	11.0 - 36.6	0.34	1.7	31
			SRS1812	41.0	46.0	4.85	31.9 - 60.0	n/a	1.6	31
			SRS1813	38.0	41.1	3.05	32.2 - 49.9	n/a	1.4	31
			SRS1814	33.0	36.4	4.67	22.9 - 50.0	n/a	1.2	31
			SRS1815	27.7	26.2	7.40	4.7 - 47.6	0.26	2.2	31



Agriculture Laboratory Proficiency (ALP) Program

Performance Analysis Report - Test Cycle 37

CTS Lab Code: U6401A

Laboratory Performance Summary - Soil Properties

Performance Review of Laboratory-Sample Biases

z-scores calculated using Lab Median and mean average deviation
(numbers closer to zero indicate closer agreement with other laboratories and
scores outside limits in red)

Test Code	Analysis	SRS1811	SRS1812	SRS1813	SRS1814	SRS1815
101	Saturated Paste Moisture	1.55	1.81	0.09	2.86	2.20
102	pH - sp	0.02	0.00	-1.30	0.11	-0.83
103	ECe - sp	-0.60	-1.49	-0.77	-2.97	-0.58
104	HCO ₃ -sp	2.12	0.59	-0.44	0.15	0.87
105	K - sp	0.00	-1.45	-2.33	-1.51	-1.50
106	Ca - sp	-0.23	-1.25	-1.40	-2.55	-1.06
107	Mg - sp	-0.43	-2.65	-1.63	-4.27	-1.33
108	Na - sp	1.12	-0.16	1.25	-0.06	-2.41
109	SAR - sp	3.04	0.65	2.20	1.51	-0.49
110	Cl - sp	-1.21	-1.00	0.00	-1.30	-2.15
111	SO ₄ - sp	-0.90	-3.22	-0.85	-3.37	-1.30
135	PO ₄ -P Olsen/Bicarb (1:20)	15.19	17.48	2.07	12.77	21.29
141	K Ammonium Acetate	1.22	3.08	-0.72	2.22	1.19
142	Ca Ammonium Acetate	1.13	2.73	-1.34	2.57	1.65
143	Mg Ammonium Acetate	0.93	1.10	-1.41	1.67	1.27
144	Na Ammonium Acetate	1.47	0.15	3.56	7.57	0.97
170	Zn - DTPA	2.29	1.42	3.39	3.62	7.04
171	Mn - DTPA	-0.02	0.09	0.57	1.01	2.28
172	Fe - DTPA	6.87	-5.29	8.22	-1.54	11.41
173	Cu - DTPA	1.02	0.74	3.21	3.01	4.10
182	SOM - Walkley-Black	2.34	2.36	5.65	-8.03	-0.90
183	SOM - LOI (% Wt loss)	3.20	1.50	1.39	2.67	2.70
185	CaCO ₃ Content	-1.01	0.85	-1.00	0.75	-1.00
186	CEC - Cation Displacement	2.26	1.72	3.56	2.73	5.53
189	Sand 2000 - 50 um	-0.03	-0.28	0.00	-0.24	-0.88
190	Silt 50 - 2 um	0.55	1.16	1.15	0.90	0.09
191	Clay 2 - 0 um	-1.02	-1.02	-1.01	-0.73	0.20

*The ALP Program is operated by Collaborative Testing Services, Inc.
in cooperation with Robert O. Miller, PhD, Program Technical Director*



The Agriculture Laboratory Proficiency (ALP) Program Spring 2019 (Cycle 39) was completed in May 2019, with participation by 105 labs from the United States, Canada, Guatemala, Honduras, South Africa, Italy, Ukraine, and the Philippines. Proficiency samples consisted of five soils, four botanical and three water samples. Analytical methods evaluated are based on those published by AOAC, four regional soil work groups, the Soil Plant Analysis Council and Forestry Canada.

This Individual Performance Analysis report presents results that are particular to your laboratory. All properties and samples for which your laboratory reported results are presented in this report. An analysis of between and within laboratory performance for soil, botanicals, and water properties follows this page. A summary of results follows immediately after the analysis for each sample type. This summary condenses your between laboratory performance on a single page and may be the best place to start the review of your results.

Standard Reference Soils (SRS), materials used for the soils program were: SRS1901 a Cropley clay collected from San Luis Obispo Cty, CA; SRS1902 a loam collected from Middlesex, ON, CANADA; SRS1903 a Busti silt loam collected from Chautauqua Cty, NY; SRS1904 a Crosby silt loam collected from Madison Cty, IL; and SRS1905 a Deerford silt loam collected from East Baton Rouge Cty, LA. Standard Reference Botanical (SRB) materials were: SRB1901 pistachio leaf composite from CA; SRB1902 spinach leaf composite from CA; SRB1903 corn leaf composite from IA and SRB1904 citrus leaf composite from CA. Standard Reference Water (SRW) solutions represent agriculture water samples collected from: SRW1901 a canal in CO, SRW1902 well source in CO, and SRW1903 a surface canal in CO.

It is important to remember that all ALP Program evaluations are based on comparative and consensus statistics; users must be aware that small group statistics are inherently less robust than large group statistics, even though robust evaluations have been preferentially chosen. No comparative results are provided for analyses with fewer than 5 reported results. Results of all laboratories that reported for each property may be found in the web-based summary report posted on the CTS Web site.

Quick Key to your Performance Analysis Report

Lab Mean	The mean of the triplicate determinations submitted for each sample-property.
Grand Median	The median of all included Lab Means submitted for each sample-property.
MAD	The median of the differences (absolute values) between the Grand Median and the Lab Means.
95% Conf Interval	The estimated range of value which is likely to include the sample-property value, calculated from the Grand Median and the M.A.D.
WithinLab Performance, k	The ratio (standard or z-score) of each laboratory standard deviation within each sample-property and the WithinLab Avg STD (see below). A score of 1 indicates that variation within a laboratory for that sample-property was the same as the average variation.
WithinLab Avg STD	The average (sum of squares) of the standard deviations of the triplicate determinations submitted for each sample-property.
Laboratory-Sample Bias (from summary page)	The ratio (standard or z-score) of each laboratory difference, between the Lab Mean and the Grand Median, and the M.A.D. A score of 0 indicates agreement of the laboratory with the consensus average.



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
101	Saturated Paste Moisture	Percent	SRS1901	84.5	74.0	5.00	59.5 - 88.5	1.69	1.4	23
			SRS1902	39.9	36.7	2.67	28.9 - 44.4	2.06	1.3	23
			SRS1903	55.7	50.7	3.49	40.6 - 60.8	1.82	1.0	23
			SRS1904	49.6	45.5	3.87	34.3 - 56.7	2.56 X	1.6	23
			SRS1905	37.8	39.0	3.23	29.6 - 48.3	2.28 X	1.1	23
102	pH - sp	Unit	SRS1901	7.60	7.79	0.12	7.45 - 8.12	0.00	0.05	21
			SRS1902	7.00 X	7.42	0.07	7.21 - 7.62	n/a	0.04	21
			SRS1903	4.80 X	5.23	0.08	5.01 - 5.45	0.00	0.16	21
			SRS1904	5.67 X	6.00	0.05	5.86 - 6.15	1.37	0.04	21
			SRS1905	6.93 X	7.25	0.07	7.04 - 7.45	1.56	0.04	21
103	ECe - sp	dS/m	SRS1901	0.58	0.64	0.07	0.43 - 0.84	1.15	0.03	26
			SRS1902	1.39 X	2.02	0.10	1.72 - 2.32	1.02	0.08	26
			SRS1903	2.49 X	3.97	0.20	3.38 - 4.56	1.57	0.10	26
			SRS1904	1.43 X	1.92	0.14	1.52 - 2.33	0.63	0.11	26
			SRS1905	1.64 X	2.10	0.13	1.73 - 2.47	0.22	0.07	26
105	K - sp	mmolc/L	SRS1901	0.087 X	0.10	0.005	0.09 - 0.12	0.20	0.028	15
			SRS1902	1.92	2.17	0.21	1.57 - 2.77	0.91	0.11	18
			SRS1903	0.48 X	0.57	0.020	0.51 - 0.63	0.29	0.03	18
			SRS1904	0.42 X	0.46	0.010	0.43 - 0.49	0.61	0.02	18
			SRS1905	0.26	0.27	0.018	0.22 - 0.32	0.45	0.03	17
106	Ca - sp	mmolc/L	SRS1901	2.43	1.93	0.22	1.29 - 2.57	3.16 X	0.21	24
			SRS1902	12.1	14.2	1.24	10.6 - 17.8	0.81	0.9	24
			SRS1903	19.4 X	25.5	2.03	19.6 - 31.4	0.52	0.9	24
			SRS1904	9.99 X	12.3	0.79	10.0 - 14.6	0.70	0.67	24
			SRS1905	13.4 X	16.8	1.10	13.6 - 20.0	0.29	0.7	23
107	Mg - sp	mmolc/L	SRS1901	2.55	3.00	0.33	2.04 - 3.96	0.31	0.26	24
			SRS1902	1.35	1.61	0.13	1.24 - 1.98	0.91	0.09	24
			SRS1903	5.94	7.93	0.87	5.41 - 10.44	0.46	0.35	24
			SRS1904	4.28	5.34	0.54	3.77 - 6.91	0.65	0.25	24
			SRS1905	4.22	5.20	0.57	3.56 - 6.84	0.19	0.26	23
108	Na - sp	mmolc/L	SRS1901	2.02	2.20	0.17	1.70 - 2.70	0.56	0.14	24
			SRS1902	0.43	0.32	0.05	0.17 - 0.46	1.88	0.06	23
			SRS1903	2.25	2.58	0.18	2.04 - 3.11	0.24	0.11	24
			SRS1904	0.35	0.38	0.06	0.21 - 0.56	0.08	0.07	24
			SRS1905	2.23	2.42	0.11	2.10 - 2.73	0.42	0.10	23
109	SAR - sp	value	SRS1901	1.28	1.41	0.06	1.24 - 1.59	0.81	0.07	18
			SRS1902	0.17	0.12	0.027	0.04 - 0.19	0.99	0.06	14
			SRS1903	0.63	0.64	0.020	0.58 - 0.70	0.00	0.02	18
			SRS1904	0.13	0.13	0.016	0.09 - 0.18	0.00	0.03	16
			SRS1905	0.75	0.74	0.027	0.66 - 0.81	0.34	0.03	18
110	Cl - sp	mmolc/L	SRS1901	0.69	0.91	0.13	0.53 - 1.29	0.12	0.10	23
			SRS1902	0.71	0.97	0.09	0.71 - 1.23	1.18	0.06	22
			SRS1903	1.70 X	2.40	0.24	1.72 - 3.09	1.27	0.09	23
			SRS1904	2.60	3.14	0.31	2.23 - 4.05	1.11	0.12	23
			SRS1905	1.48	1.87	0.19	1.31 - 2.43	0.49	0.06	23



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
111	SO4 - sp	mmolc/L	SRS1901	1.59	1.34	0.16	0.88 - 1.80	3.06 X	0.16	21
			SRS1902	1.07	1.38	0.11	1.06 - 1.70	1.67	0.11	20
			SRS1903	1.36 X	2.02	0.13	1.65 - 2.38	0.37	0.19	20
			SRS1904	0.97 X	1.58	0.16	1.11 - 2.05	0.39	0.17	21
			SRS1905	10.1	13.0	1.57	8.5 - 17.6	0.23	0.5	21
112	NO3 - sp	mmolc/L	SRS1901	0.017	0.030	0.013	0.000 - 0.069	0.09	0.065	10
			SRS1902	3.89 X	13.1	2.13	6.9 - 19.2	0.52	0.64	15
			SRS1903	10.5 X	34.0	3.39	24.1 - 43.8	0.76	1.4	15
			SRS1904	3.46 X	10.6	1.41	6.5 - 14.7	0.43	0.50	15
			SRS1905	2.04 X	7.06	1.36	3.11 - 11.00	0.06	0.43	15
127	NO3-N Cd. Rd.	mg/kg	SRS1901	8.00	7.39	0.59	5.69 - 9.09	0.26	0.38	44
			SRS1902	96.6	80.7	6.31	62.4 - 99.0	0.78	3.2	44
			SRS1903	302.7	246.6	31.6	155.0 - 338.1	0.58	17.1	44
			SRS1904	98.7 X	75.1	5.27	59.8 - 90.4	0.48	2.5	44
			SRS1905	56.3 X	45.0	3.37	35.2 - 54.8	0.54	1.6	44
130	NO3-N Ion Chr.	mg/kg	SRS1901	0.47	0.47	n/a	n/a	1.00	0.09	1
			SRS1902	48.3	48.3	n/a	n/a	1.00	7.1	1
			SRS1903	180.0	180.0	n/a	n/a	1.00	16.1	1
			SRS1904	53.4	53.4	n/a	n/a	1.00	7.1	1
			SRS1905	23.9	23.9	n/a	n/a	1.00	1.7	1
131	NH4 - N (KCl Extr.)	mg/kg	SRS1901	15.0 X	8.03	0.83	5.61 - 10.44	1.14	0.9	32
			SRS1902	8.00	6.70	0.77	4.47 - 8.93	n/a	0.42	32
			SRS1903	56.3	47.1	6.68	27.8 - 66.5	1.71	1.3	32
			SRS1904	20.0	16.8	1.70	11.9 - 21.8	n/a	0.6	32
			SRS1905	32.0	28.2	3.15	19.1 - 37.3	n/a	0.9	32
135	PO4-P Olsen/Bicarb (1:20)	mg/kg	SRS1901	30.7	26.2	2.43	19.1 - 33.2	0.62	1.9	38
			SRS1902	26.0 X	12.5	1.87	7.0 - 17.9	2.60 X	1.0	38
			SRS1903	42.3 X	19.8	3.30	10.2 - 29.4	0.96	1.2	38
			SRS1904	45.7 X	24.2	2.51	16.9 - 31.4	0.53	1.1	38
			SRS1905	23.3 X	11.0	1.67	6.2 - 15.8	0.63	0.9	38
141	K Ammonium Acetate	mg/kg	SRS1901	284.7	279.8	14.0	239.2 - 320.5	0.38	11.9	46
			SRS1902	221.3	215.5	16.2	168.6 - 262.3	0.21	10.1	46
			SRS1903	111.0	92.8	11.7	59.0 - 126.6	0.32	3.1	45
			SRS1904	228.3	225.5	10.7	194.4 - 256.7	0.18	8.4	46
			SRS1905	71.0	71.7	5.90	54.6 - 88.8	n/a	3.4	45
142	Ca Ammonium Acetate	mg/kg	SRS1901	4,290.0	3,925.7	253.9	3,189.4 - 4,662.1	1.11	106.1	45
			SRS1902	4,473.3	3,411.0	380.3	2,308.0 - 4,514.0	0.97	93.7	45
			SRS1903	1,613.3	1,374.2	174.8	867.2 - 1,881.2	0.11	54.8	45
			SRS1904	2,943.3	2,898.4	199.8	2,318.9 - 3,477.9	0.24	96.8	45
			SRS1905	2,056.7	1,749.1	210.9	1,137.6 - 2,360.6	0.53	60.8	45
143	Mg Ammonium Acetate	mg/kg	SRS1901	3,086.7	2,991.6	269.6	2,209.7 - 3,773.5	0.81	115.0	45
			SRS1902	100.7	102.8	9.65	74.8 - 130.8	0.24	6.4	45
			SRS1903	185.7	164.3	24.4	93.6 - 235.1	0.08	6.9	45
			SRS1904	511.0	526.2	32.1	433.0 - 619.4	0.28	16.3	45
			SRS1905	240.0	220.8	21.2	159.2 - 282.4	0.61	7.5	45



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
144	Na - Ammonium Acetate	mg/kg	SRS1901	402.7 X	200.0	7.67	177.8 - 222.2	0.86	7.9	41
			SRS1902	35.7 X	12.5	2.89	4.1 - 20.9	0.40	2.9	40
			SRS1903	105.7 X	46.4	8.81	20.9 - 72.0	0.15	3.9	40
			SRS1904	163.3 X	14.7	3.10	5.7 - 23.7	0.82	2.5	40
			SRS1905	112.7 X	43.6	6.28	25.4 - 61.9	0.61	2.5	40
170	Zn - DTPA	mg/kg	SRS1901	0.80 X	1.08	0.09	0.82 - 1.33	1.23	0.06	41
			SRS1902	4.56	3.64	0.55	2.05 - 5.22	0.13	0.27	41
			SRS1903	0.97	0.93	0.14	0.53 - 1.34	0.70	0.05	41
			SRS1904	1.62	1.70	0.16	1.23 - 2.16	0.18	0.11	41
			SRS1905	0.63	0.72	0.09	0.45 - 0.99	0.67	0.04	41
171	Mn - DTPA	mg/kg	SRS1901	24.4	24.4	3.63	13.8 - 34.9	0.26	1.3	35
			SRS1902	1.24	0.70	0.24	0.01 - 1.39	0.19	0.08	35
			SRS1903	72.6	60.5	11.6	26.9 - 94.1	0.13	4.3	35
			SRS1904	30.8	30.0	2.31	23.3 - 36.7	0.25	1.5	35
			SRS1905	20.1	14.5	5.65	0.0 - 30.9	0.19	1.2	35
172	Fe - DTPA	mg/kg	SRS1901	11.8	14.0	1.93	8.4 - 19.6	0.18	0.9	37
			SRS1902	51.8 X	28.3	5.59	12.0 - 44.5	0.33	2.0	37
			SRS1903	239.3	160.0	36.2	55.0 - 265.0	0.27	8.6	37
			SRS1904	116.7 X	81.6	10.7	50.5 - 112.8	0.30	3.9	37
			SRS1905	49.5 X	25.7	5.77	9.0 - 42.4	0.51	1.8	37
173	Cu - DTPA	mg/kg	SRS1901	2.77	2.96	0.28	2.16 - 3.76	0.24	0.13	37
			SRS1902	0.89	0.74	0.15	0.32 - 1.16	0.21	0.06	37
			SRS1903	2.13	1.74	0.29	0.91 - 2.57	0.16	0.09	37
			SRS1904	2.84	2.53	0.28	1.71 - 3.35	0.37	0.11	37
			SRS1905	0.76	0.69	0.09	0.43 - 0.94	0.13	0.04	37
177	B - Hot Wat.	mg/kg	SRS1901	0.85	1.49	0.26	0.73 - 2.25	1.09	0.09	22
			SRS1902	0.27	0.51	0.11	0.20 - 0.82	0.75	0.05	22
			SRS1903	0.25	0.49	0.12	0.15 - 0.83	0.87	0.06	22
			SRS1904	0.26	0.62	0.13	0.24 - 1.00	1.22	0.06	22
			SRS1905	0.077	0.18	0.06	0.00 - 0.36	0.23	0.025	19
182	SOM - Walkley-Black	Percent	SRS1901	4.10	3.81	0.29	2.98 - 4.64	1.26	0.16	16
			SRS1902	5.27	6.22	0.58	4.53 - 7.91	0.47	0.25	16
			SRS1903	4.87	4.53	0.33	3.57 - 5.50	0.79	0.15	16
			SRS1904	3.30	3.13	0.17	2.62 - 3.63	0.67	0.15	16
			SRS1905	2.43 X	1.93	0.11	1.62 - 2.24	2.79 X	0.18	16
183	SOM - LOI (% Wt loss)	Percent	SRS1901	5.87	5.10	0.27	4.31 - 5.89	0.38	0.15	44
			SRS1902	6.60	5.98	0.25	5.25 - 6.71	0.00	0.17	44
			SRS1903	6.10 X	5.56	0.16	5.10 - 6.02	0.00	0.16	44
			SRS1904	4.27 X	3.77	0.15	3.32 - 4.21	0.58	0.10	44
			SRS1905	2.63	2.41	0.09	2.14 - 2.68	0.75	0.08	44
185	CaCO3 Content	Percent	SRS1901	5.47	2.15	1.64	0.00 - 6.91	1.65	0.25	9
			SRS1902	10.7	8.01	2.73	0.10 - 15.91	0.94	0.4	11
			SRS1903	0.57	0.44	0.13	0.06 - 0.81	1.61	0.22	7
			SRS1904	1.10	0.61	0.35	0.00 - 1.61	1.02	0.26	9
			SRS1905	3.30 X	2.09	0.29	1.26 - 2.92	0.79	0.33	9



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
186	CEC - Cation Displacement	cmol/kg	SRS1901	53.2	44.4	4.58	31.1 - 57.7	1.73	2.9	9
			SRS1902	19.5	15.9	2.70	8.1 - 23.8	0.77	0.9	9
			SRS1903	21.3 X	13.4	1.87	8.0 - 18.9	0.79	0.9	9
			SRS1904	27.8	21.7	2.52	14.4 - 29.1	1.17	1.1	9
			SRS1905	12.4	9.73	1.07	6.64 - 12.83	0.74	0.4	9



Agriculture Laboratory Proficiency (ALP) Program

Performance Analysis Report - Test Cycle 38

CTS Lab Code: U6401A

Laboratory Performance Summary - Soil Properties

Performance Review of Laboratory-Sample Biases

z-scores calculated using Lab Median and mean average deviation
(numbers closer to zero indicate closer agreement with other laboratories and
scores outside limits in red)

Test Code	Analysis	SRS1901	SRS1902	SRS1903	SRS1904	SRS1905
101	Saturated Paste Moisture	2.10	1.21	1.45	1.06	-0.35
102	pH - sp	-1.61	-5.81	-5.73	-6.70	-4.48
103	ECe - sp	-0.85	-6.10	-7.28	-3.54	-3.61
105	K - sp	-3.50	-1.21	-4.50	-4.00	-0.83
106	Ca - sp	2.27	-1.75	-2.98	-2.95	-3.07
107	Mg - sp	-1.36	-2.06	-2.29	-1.96	-1.74
108	Na - sp	-1.06	2.19	-1.77	-0.59	-1.70
109	SAR - sp	-2.17	1.88	-0.66	-0.21	0.50
110	Cl - sp	-1.63	-2.89	-2.99	-1.73	-2.00
111	SO4 - sp	1.57	-2.80	-5.21	-3.79	-1.87
112	NO3 - sp	-1.00	-4.30	-6.93	-5.07	-3.69
127	NO3-N Cd. Rd.	1.04	2.52	1.78	4.49	3.36
131	NH4 - N (KCl Extr.)	8.37	1.69	1.38	1.86	1.21
135	PO4-P Olsen/Bicarb (1:20)	1.85	7.23	6.83	8.57	7.40
141	K Ammonium Acetate	0.35	0.36	1.56	0.26	-0.11
142	Ca Ammonium Acetate	1.43	2.79	1.37	0.22	1.46
143	Mg Ammonium Acetate	0.35	-0.22	0.87	-0.47	0.90
144	Na Ammonium Acetate	26.43	8.03	6.73	47.96	10.99
170	Zn - DTPA	-3.11	1.68	0.28	-0.48	-0.93
171	Mn - DTPA	0.00	2.27	1.04	0.34	1.00
172	Fe - DTPA	-1.17	4.20	2.19	3.26	4.12
173	Cu - DTPA	-0.67	1.05	1.38	1.08	0.78
177	B - Hot Wat.	-2.43	-2.20	-2.10	-2.74	-1.70
182	SOM - Walkley-Black	1.00	-1.63	1.00	1.00	4.65
183	SOM - LOI (% Wt loss)	2.80	2.47	3.43	3.27	2.43
185	CaCO3 Content	2.02	1.00	1.00	1.41	4.23
186	CEC - Cation Displacement	1.93	1.32	4.22	2.39	2.50

*The ALP Program is operated by Collaborative Testing Services, Inc.
in cooperation with Robert O. Miller, PhD, Program Technical Director*



The Agriculture Laboratory Proficiency (ALP) Program Summer 2019 (Cycle 39) was completed in August 2019, with participation by 106 labs from the United States, Canada, Guatemala, Honduras, South Africa, Italy, Ukraine, and the Philippines. Proficiency samples consisted of five soils, four botanical and three water samples. Analytical methods evaluated are based on those published by AOAC, four regional soil work groups, the Soil Plant Analysis Council and Forestry Canada.

This Individual Performance Analysis report presents results that are particular to your laboratory. All properties and samples for which your laboratory reported results are presented in this report. An analysis of between and within laboratory performance for soil, botanicals, and water properties follows this page. A summary of results follows immediately after the analysis for each sample type. This summary condenses your between laboratory performance on a single page and may be the best place to start the review of your results.

Standard Reference Soils (SRS), materials used for the soils program were: SRS1906 a Mainly Orthic sandy loam collected from Arcola, SK CANADA; SRS1907 a Loring silt loam collected from Haywood Cty, TN; SRS1908 a Casa Grande sandy loam collected from Pinal Cty, AZ; SRS1909 a Broadbrook silt loam collected from Hartford Cty, CT; and SRS1910 a Monona-Ida silt loam collected from Sarpy Cty, NE. Standard Reference Botanical (SRB) materials were: SRB1905 soybean leaf composite from AR; SRB1906 potato leaf composite from WA; SRB1907 grape petiole composite from CA and SRB1908 arugula leaf composite from CA. Standard Reference Water (SRW) solutions represent agriculture water samples collected from: SRW1904 a field tile drain in MN, SRW1905 a canal in WY, and SRW1906 a creek in WA.

It is important to remember that all ALP Program evaluations are based on comparative and consensus statistics; users must be aware that small group statistics are inherently less robust than large group statistics, even though robust evaluations have been preferentially chosen. No comparative results are provided for analyses with fewer than 5 reported results. Results of all laboratories that reported for each property may be found in the web-based summary report posted on the CTS Web site.

Quick Key to your Performance Analysis Report

Lab Mean	The mean of the triplicate determinations submitted for each sample-property.
Grand Median	The median of all included Lab Means submitted for each sample-property.
MAD	The median of the differences (absolute values) between the Grand Median and the Lab Means.
95% Conf Interval	The estimated range of value which is likely to include the sample-property value, calculated from the Grand Median and the M.A.D.
WithinLab Performance, k	The ratio (standard or z-score) of each laboratory standard deviation within each sample-property and the WithinLab Avg STD (see below). A score of 1 indicates that variation within a laboratory for that sample-property was the same as the average variation.
WithinLab Avg STD	The average (sum of squares) of the standard deviations of the triplicate determinations submitted for each sample-property.
Laboratory-Sample Bias (from summary page)	The ratio (standard or z-score) of each laboratory difference, between the Lab Mean and the Grand Median, and the M.A.D. A score of 0 indicates agreement of the laboratory with the consensus average.



Agriculture Laboratory Proficiency (ALP) Program

Summer 2019

Performance Analysis Report - Test Cycle 39

CTS Lab Code: U6401A

Web Code: Z4C4F3 for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
101 Saturated Paste Moisture	Percent		SRS1906	32.3	28.6	2.53	21.2 - 35.9	2.68 X	1.2	21
			SRS1907	38.2	36.0	2.37	29.1 - 42.8	1.31	1.5	21
			SRS1908	39.6	33.6	3.07	24.7 - 42.5	1.53	1.3	21
			SRS1909	42.0	38.3	2.43	31.2 - 45.3	1.66	0.8	21
			SRS1910	59.1 X	46.3	3.50	36.2 - 56.5	1.58	1.4	21
102 pH - sp	Unit		SRS1906	7.00 X	7.35	0.11	7.03 - 7.68	n/a	0.05	20
			SRS1907	6.87 X	7.28	0.07	7.07 - 7.48	1.24	0.05	20
			SRS1908	7.70	7.81	0.08	7.57 - 8.05	0.00	0.08	20
			SRS1909	5.60	5.74	0.06	5.57 - 5.92	0.00	0.06	20
			SRS1910	5.40 X	5.58	0.043	5.46 - 5.71	0.00	0.03	20
103 ECe - sp	dS/m		SRS1906	1.90 X	2.64	0.22	2.02 - 3.27	1.58	0.10	25
			SRS1907	1.05 X	1.53	0.10	1.25 - 1.81	1.98	0.07	25
			SRS1908	1.32	1.62	0.13	1.26 - 1.99	1.48	0.07	25
			SRS1909	1.11 X	1.62	0.12	1.27 - 1.96	1.39	0.06	25
			SRS1910	0.89 X	1.16	0.08	0.93 - 1.39	0.43	0.05	25
104 HCO3 -sp	mmolc/L		SRS1906	1.32	1.41	0.27	0.64 - 2.18	1.29	0.13	8
			SRS1907	2.64	2.97	0.42	1.74 - 4.19	1.18	0.15	8
			SRS1908	2.14	2.08	0.16	1.61 - 2.55	1.51	0.20	8
			SRS1909	0.61	0.43	0.17	0.00 - 0.92	0.00	0.07	8
			SRS1910	0.41	0.37	0.11	0.05 - 0.68	1.67	0.11	7
105 K - sp	mmolc/L		SRS1906	0.65	0.68	0.041	0.57 - 0.80	2.92 X	0.05	16
			SRS1907	0.69	0.90	0.08	0.69 - 1.12	2.19 X	0.03	16
			SRS1908	0.28	0.32	0.024	0.25 - 0.39	0.95	0.02	16
			SRS1909	0.52 X	0.71	0.06	0.54 - 0.87	0.92	0.03	16
			SRS1910	0.56	0.69	0.06	0.52 - 0.86	0.46	0.03	16
106 Ca - sp	mmolc/L		SRS1906	15.3 X	21.9	1.17	18.5 - 25.3	1.29	1.2	20
			SRS1907	7.51 X	11.6	0.96	8.8 - 14.3	2.10	0.59	20
			SRS1908	4.09	5.24	0.49	3.81 - 6.67	0.70	0.41	20
			SRS1909	5.61 X	8.12	0.61	6.35 - 9.89	1.93	0.33	20
			SRS1910	4.90 X	6.77	0.57	5.13 - 8.41	0.57	0.35	20
107 Mg - sp	mmolc/L		SRS1906	2.49 X	3.81	0.22	3.18 - 4.44	1.43	0.17	20
			SRS1907	1.43 X	2.25	0.13	1.86 - 2.63	1.81 X	0.11	20
			SRS1908	0.89	1.09	0.11	0.76 - 1.41	0.56	0.16	20
			SRS1909	3.30 X	5.24	0.39	4.09 - 6.38	1.91 X	0.22	20
			SRS1910	1.78 X	2.58	0.09	2.32 - 2.84	0.46	0.14	20
108 Na - sp	mmolc/L		SRS1906	0.46	0.47	0.06	0.29 - 0.65	0.85	0.09	19
			SRS1907	0.58	0.51	0.040	0.39 - 0.62	2.61 X	0.04	20
			SRS1908	7.92	9.60	0.66	7.70 - 11.50	1.11	0.71	20
			SRS1909	0.58 X	0.45	0.033	0.36 - 0.55	1.13	0.05	20
			SRS1910	0.48	0.38	0.044	0.25 - 0.50	0.98	0.04	20
109 SAR - sp	value		SRS1906	0.15	0.13	0.019	0.08 - 0.19	0.61	0.02	14
			SRS1907	0.28 X	0.19	0.019	0.14 - 0.25	3.21 X	0.03	15
			SRS1908	5.01	5.35	0.14	4.94 - 5.76	1.60	0.21	15
			SRS1909	0.27 X	0.18	0.027	0.10 - 0.26	1.37	0.02	15
			SRS1910	0.26 X	0.17	0.021	0.11 - 0.23	1.11	0.02	15



Agriculture Laboratory Proficiency (ALP) Program

Summer 2019

Performance Analysis Report - Test Cycle 39

CTS Lab Code: U6401A

Web Code: Z4C4F3 for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
110 Cl - sp	mmolc/L		SRS1906	0.26	0.33	0.06	0.16 - 0.50	0.97	0.07	16
			SRS1907	0.36	0.51	0.12	0.17 - 0.85	0.52	0.05	19
			SRS1908	2.31	2.92	0.45	1.62 - 4.22	0.66	0.36	20
			SRS1909	1.58 X	2.23	0.22	1.58 - 2.88	1.77	0.10	20
			SRS1910	0.26	0.27	0.041	0.15 - 0.39	0.12	0.05	16
111 SO4 - sp	mmolc/L		SRS1906	0.99 X	1.71	0.15	1.28 - 2.14	2.97 X	0.12	17
			SRS1907	1.23 X	1.89	0.16	1.43 - 2.34	0.47	0.09	18
			SRS1908	3.92	4.47	0.43	3.21 - 5.72	1.12	0.32	18
			SRS1909	0.63	0.73	0.05	0.58 - 0.88	1.14	0.07	17
			SRS1910	0.39	0.41	0.030	0.32 - 0.49	0.91	0.03	17
112 NO3 - sp	mmolc/L		SRS1906	7.28 X	24.7	0.53	23.1 - 26.2	0.73	0.99	14
			SRS1907	2.02 X	8.99	1.41	4.91 - 13.07	1.11	0.61	14
			SRS1908	1.98 X	6.77	0.52	5.27 - 8.26	0.57	0.47	14
			SRS1909	3.45 X	12.1	0.58	10.4 - 13.8	1.18	0.43	14
			SRS1910	2.96 X	9.61	0.45	8.30 - 10.91	0.47	0.35	14
127 NO3-N Cd. Rd.	mg/kg		SRS1906	101.7	96.2	6.98	76.0 - 116.5	0.57	4.4	44
			SRS1907	64.4	55.2	3.30	45.6 - 64.8	0.22	2.0	44
			SRS1908	34.2	30.7	2.00	24.9 - 36.5	0.08	2.1	44
			SRS1909	77.6	67.5	3.68	56.8 - 78.2	0.42	1.8	44
			SRS1910	68.3	57.2	4.93	42.9 - 71.5	0.42	1.7	44
131 NH4 - N (KCl Extr.)	mg/kg		SRS1906	4.67 X	2.14	0.55	0.54 - 3.74	2.34 X	0.25	33
			SRS1907	21.3	19.3	1.86	13.9 - 24.7	0.77	0.7	33
			SRS1908	3.00	2.06	0.47	0.69 - 3.43	n/a	0.26	33
			SRS1909	12.3	9.93	1.04	6.92 - 12.94	1.29	0.4	33
			SRS1910	11.7 X	7.17	0.95	4.42 - 9.91	5.71 X	0.5	33
135 PO4-P Olsen/Bicarb (1:20)	mg/kg		SRS1906	19.3 X	12.5	1.06	9.4 - 15.6	0.75	0.8	35
			SRS1907	32.3 X	18.2	1.76	13.1 - 23.4	0.60	1.0	35
			SRS1908	8.00 X	4.87	1.06	1.78 - 7.96	1.93	0.52	35
			SRS1909	130.3	113.8	9.82	85.3 - 142.3	0.62	4.1	35
			SRS1910	19.0 X	9.00	1.33	5.13 - 12.87	n/a	0.7	35
141 K Ammonium Acetate	mg/kg		SRS1906	157.0 X	130.0	7.37	108.6 - 151.4	0.57	5.3	46
			SRS1907	256.0 X	192.5	10.6	161.7 - 223.3	0.91	5.0	47
			SRS1908	445.0 X	352.0	22.7	286.2 - 417.7	0.88	9.1	47
			SRS1909	152.7 X	125.6	7.00	105.3 - 145.9	1.73	6.4	46
			SRS1910	401.0 X	285.9	14.9	242.7 - 329.1	1.08	9.4	47
142 Ca Ammonium Acetate	mg/kg		SRS1906	4,236.7 X	3,000.7	406.8	1,821.0 - 4,180.3	1.27	73.4	44
			SRS1907	4,343.3 X	2,708.7	428.9	1,464.7 - 3,952.6	1.14	89.8	44
			SRS1908	6,010.0 X	4,260.0	586.3	2,559.6 - 5,960.4	1.23	114.0	44
			SRS1909	1,193.3 X	1,010.2	58.8	839.8 - 1,180.7	1.73	54.5	44
			SRS1910	3,103.3 X	2,297.8	85.6	2,049.6 - 2,546.1	1.13	80.0	44
143 Mg Ammonium Acetate	mg/kg		SRS1906	173.0	144.6	11.6	110.9 - 178.3	0.68	3.9	44
			SRS1907	168.0 X	126.2	6.66	106.9 - 145.5	0.78	3.8	44
			SRS1908	354.3 X	276.2	20.0	218.1 - 334.2	1.22	9.8	44
			SRS1909	205.3 X	173.0	9.33	145.9 - 200.1	1.94	6.2	44
			SRS1910	505.3 X	363.0	16.7	314.6 - 411.5	1.30	10.0	44



Agriculture Laboratory Proficiency (ALP) Program

Summer 2019

Performance Analysis Report - Test Cycle 39

CTS Lab Code: U6401A

Web Code: Z4C4F3 for Analysis #801

Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
144 Na - Ammonium Acetate	mg/kg		SRS1906	31.0 X	11.8	3.27	2.4 - 21.3	2.05	1.5	39
			SRS1907	24.0 X	13.3	3.31	3.7 - 22.9	4.95 X	2.1	39
			SRS1908	376.0 X	306.2	19.6	249.4 - 363.0	1.36	10.8	40
			SRS1909	38.7 X	14.4	2.73	6.5 - 22.3	1.06	1.4	39
			SRS1910	29.0 X	15.3	3.18	6.1 - 24.5	1.56	3.4	39
170 Zn - DTPA	mg/kg		SRS1906	0.050 X	0.21	0.043	0.08 - 0.34	0.00	0.061	42
			SRS1907	0.65	0.79	0.08	0.54 - 1.04	0.16	0.12	43
			SRS1908	0.11 X	0.29	0.05	0.14 - 0.44	0.26	0.04	43
			SRS1909	3.26	3.26	0.29	2.42 - 4.10	0.11	0.29	43
			SRS1910	0.53	0.55	0.06	0.36 - 0.73	0.33	0.08	43
171 Mn - DTPA	mg/kg		SRS1906	4.14	4.14	1.54	0.00 - 8.60	0.07	0.41	37
			SRS1907	13.2	14.0	2.31	7.3 - 20.7	0.33	0.9	37
			SRS1908	3.93	3.39	0.80	1.08 - 5.70	0.36	0.31	37
			SRS1909	27.9	29.8	1.82	24.5 - 35.1	0.16	1.3	37
			SRS1910	24.0	17.4	4.94	3.0 - 31.7	0.18	1.6	37
172 Fe - DTPA	mg/kg		SRS1906	3.09	2.51	0.41	1.32 - 3.70	0.23	0.25	39
			SRS1907	37.1	26.3	3.90	15.0 - 37.6	0.29	2.0	40
			SRS1908	2.27 X	1.03	0.20	0.44 - 1.61	1.22	0.11	39
			SRS1909	49.8 X	33.0	3.95	21.5 - 44.5	0.27	2.6	40
			SRS1910	51.5 X	35.9	5.06	21.2 - 50.6	0.52	2.1	40
173 Cu - DTPA	mg/kg		SRS1906	0.32	0.34	0.032	0.25 - 0.43	0.39	0.03	39
			SRS1907	0.82	0.73	0.07	0.52 - 0.94	0.24	0.05	39
			SRS1908	1.38	1.18	0.12	0.83 - 1.53	0.23	0.07	39
			SRS1909	2.85	2.40	0.26	1.63 - 3.17	0.20	0.16	39
			SRS1910	0.81	0.65	0.08	0.42 - 0.89	0.55	0.06	39
177 B - Hot Wat.	mg/kg		SRS1906	0.20	0.33	0.06	0.14 - 0.51	0.55	0.05	22
			SRS1907	0.41 X	0.71	0.09	0.46 - 0.96	1.12	0.07	22
			SRS1908	0.92	1.25	0.22	0.60 - 1.90	1.28	0.10	22
			SRS1909	0.19 X	0.40	0.07	0.19 - 0.60	0.53	0.05	22
			SRS1910	0.28	0.47	0.08	0.22 - 0.71	0.37	0.06	22
179 Soil Kjeldahl N	Percent		SRS1906	0.060	0.067	0.003	0.057 - 0.076	0.00	0.004	10
			SRS1907	0.080 X	0.10	0.005	0.09 - 0.11	0.00	0.009	10
			SRS1908	0.040	0.043	0.003	0.035 - 0.050	0.00	0.003	10
			SRS1909	0.11 X	0.15	0.009	0.13 - 0.18	0.43	0.01	10
			SRS1910	0.11	0.14	0.009	0.11 - 0.16	0.48	0.01	9
182 SOM - Walkley-Black	Percent		SRS1906	1.00	1.03	0.08	0.80 - 1.27	n/a	0.10	19
			SRS1907	1.80	1.70	0.17	1.21 - 2.18	1.10	0.09	19
			SRS1908	0.70	0.70	0.12	0.34 - 1.06	0.00	0.07	18
			SRS1909	3.63	2.98	0.25	2.27 - 3.70	0.50	0.11	19
			SRS1910	2.50	2.40	0.27	1.63 - 3.17	0.66	0.15	19
183 SOM - LOI (% Wt loss)	Percent		SRS1906	1.47 X	1.28	0.05	1.12 - 1.44	1.06	0.05	46
			SRS1907	2.27 X	2.07	0.07	1.87 - 2.26	0.79	0.07	46
			SRS1908	1.43	1.27	0.14	0.86 - 1.67	0.83	0.07	46
			SRS1909	3.60	3.38	0.10	3.09 - 3.67	0.00	0.07	46
			SRS1910	3.57	3.30	0.13	2.91 - 3.69	0.66	0.09	46



Analysis # 801: Soil Properties

Test Code	Analysis	Units	Samples	Lab Mean	Grand Median	MAD	95% Conf Interval	WithinLab Performance, k	WithinLab Avg STD	Labs Rpt
185	CaCO ₃ Content	Percent	SRS1906	4.60	3.73	0.77	1.51 - 5.96	1.92 X	0.29	12
			SRS1907	3.33	3.02	0.29	2.17 - 3.87	1.63	0.19	12
			SRS1908	2.57 X	1.85	0.24	1.15 - 2.54	2.25 X	0.14	12
			SRS1909	0.43	0.90	0.20	0.32 - 1.48	0.67	0.09	7
			SRS1910	0.67	0.67	0.29	0.00 - 1.52	0.68	0.08	8
186	CEC - Cation Displacement	cmol/kg	SRS1906	9.00	8.11	0.87	5.58 - 10.65	n/a	0.35	9
			SRS1907	11.3	9.53	1.80	4.31 - 14.75	1.39	0.4	9
			SRS1908	19.3	16.3	1.27	12.6 - 20.0	0.53	1.1	9
			SRS1909	12.3	8.89	1.62	4.21 - 13.58	1.11	0.5	9
			SRS1910	23.3	19.1	2.26	12.6 - 25.7	2.04 X	1.0	9
189	Sand 2000 - 50 um	Percent	SRS1906	78.7	79.5	1.85	74.1 - 84.8	0.44	1.3	28
			SRS1907	27.7	29.0	3.28	19.5 - 38.6	0.37	1.6	28
			SRS1908	57.3	58.4	2.77	50.4 - 66.5	0.25	2.4	28
			SRS1909	56.3	57.3	3.65	46.7 - 67.9	0.42	1.4	28
			SRS1910	22.0	23.3	3.67	12.7 - 34.0	0.89	1.1	28
190	Silt 50 - 2 um	Percent	SRS1906	12.7	10.2	1.83	4.8 - 15.5	0.46	1.3	28
			SRS1907	62.3	59.3	4.22	47.1 - 71.5	0.28	2.1	28
			SRS1908	20.3	16.4	2.90	8.0 - 24.8	0.26	2.2	28
			SRS1909	41.0	37.6	4.96	23.3 - 52.0	0.76	1.3	28
			SRS1910	54.0	49.8	3.90	38.5 - 61.1	0.86	1.2	28
191	Clay 2 - 0 um	Percent	SRS1906	8.67	10.8	2.60	3.3 - 18.4	0.66	0.87	28
			SRS1907	10.00	13.1	3.37	3.4 - 22.9	n/a	1.22	28
			SRS1908	22.3	25.4	3.01	16.7 - 34.2	0.52	1.1	28
			SRS1909	2.67	5.68	2.32	0.00 - 12.40	0.77	0.75	28
			SRS1910	24.0	27.1	2.88	18.8 - 35.5	n/a	1.0	28



Agriculture Laboratory Proficiency (ALP) Program

Performance Analysis Report - Test Cycle 39

CTS Lab Code: U6401A

Laboratory Performance Summary - Soil Properties

Performance Review of Laboratory-Sample Biases

z-scores calculated using Lab Median and mean average deviation
(numbers closer to zero indicate closer agreement with other laboratories and
scores outside limits in red)

Test Code	Analysis	SRS1906	SRS1907	SRS1908	SRS1909	SRS1910
101	Saturated Paste Moisture	1.46	0.96	1.96	1.54	3.64
102	pH - sp	-3.15	-5.70	-1.33	-2.39	-4.23
103	ECe - sp	-3.45	-5.04	-2.39	-4.27	-3.37
104	HCO ₃ -sp	-0.33	-0.77	0.35	1.07	0.37
105	K - sp	-0.81	-2.89	-1.66	-3.37	-2.22
106	Ca - sp	-5.63	-4.22	-2.32	-4.11	-3.31
107	Mg - sp	-6.09	-6.14	-1.75	-4.91	-8.88
108	Na - sp	-0.20	1.76	-2.56	3.86	2.34
109	SAR - sp	1.09	4.33	-2.41	3.49	4.22
110	Cl - sp	-1.06	-1.29	-1.36	-2.90	-0.28
111	SO ₄ - sp	-4.86	-4.17	-1.26	-1.91	-0.50
112	NO ₃ - sp	-32.73	-4.96	-9.27	-14.93	-14.71
127	NO ₃ -N Cd. Rd.	0.78	2.79	1.77	2.75	2.25
131	NH ₄ - N (KCl Extr.)	4.58	1.09	1.98	2.32	4.76
135	PO ₄ -P Olsen/Bicarb (1:20)	6.43	7.99	2.94	1.68	7.50
141	K Ammonium Acetate	3.67	5.98	4.10	3.86	7.72
142	Ca Ammonium Acetate	3.04	3.81	2.98	3.12	9.41
143	Mg Ammonium Acetate	2.44	6.28	3.90	3.46	8.52
144	Na Ammonium Acetate	5.87	3.22	3.57	8.89	4.30
170	Zn - DTPA	-3.69	-1.66	-3.48	0.00	-0.26
171	Mn - DTPA	0.00	-0.36	0.68	-1.03	1.35
172	Fe - DTPA	1.40	2.78	6.16	4.26	3.08
173	Cu - DTPA	-0.44	1.15	1.62	1.68	1.88
177	B - Hot Wat.	-1.97	-3.39	-1.47	-2.98	-2.25
179	Soil Kjeldahl N	-2.00	-3.95	-1.00	-5.24	-2.75
182	SOM - Walkley-Black	-0.42	0.62	-0.01	2.64	0.38
183	SOM - LOI (% Wt loss)	3.44	3.00	1.19	2.17	2.00
185	CaCO ₃ Content	1.13	1.06	3.01	-2.33	0.00
186	CEC - Cation Displacement	1.02	1.00	2.36	2.13	1.86
189	Sand 2000 - 50 um	-0.43	-0.42	-0.40	-0.26	-0.36
190	Silt 50 - 2 um	1.36	0.72	1.34	0.68	1.08
191	Clay 2 - 0 um	-0.84	-0.93	-1.03	-1.30	-1.08