



2018 North American Proficiency Testing Program Quarter 3 Soil Report - Oct 9, 2018

Laboratory ID
303255

Soil	Soil 2018-111					Soil 2018-112			Soil 2018-113			Soil 2018-114			Soil 2018-115		
Analysis	Units	n	Median	MAD	Lab ^{1,2}	Median	MAD	Lab ^{1,2}	Median	MAD	Lab ^{1,2}	Median	MAD	Lab ^{1,2}	Median	MAD	Lab ^{1,2}
Salinity																	
Sat. Paste Moisture	%	20	38.5	2.34	38.538	48.5	2.94	52.37	43.4	3.09	43.472	44.2	3.50	44.562	56.1	3.10	58.855
pH - sp	Unit	29	7.43	0.110	7.63	5.96	0.100	6.2	6.21	0.110	6.52 *H	5.80	0.160	6.09	7.80	0.110	7.85
ECe - sp	dS/m	26	1.35	0.084	1.263	0.365	0.065	0.325	1.18	0.118	1.101	0.830	0.120	0.762	1.66	0.090	1.45
HCO3 - sp	mmolc/L	10	4.29	0.607	3.8152	1.60	0.234	1.4077	1.54	0.237	1.5437	0.900	0.100	0.7438	3.08	0.394	2.6874
Ca - sp	mmolc/L	21	7.45	0.660	5.7908 *L	2.17	0.310	1.7352	3.35	0.450	2.7934	4.82	0.735	3.988	7.45	0.769	5.958
Mg - sp	mmolc/L	21	3.49	0.463	3.0958	0.880	0.110	0.7565	1.75	0.292	1.7087	1.89	0.242	1.7452	1.86	0.221	1.6683
Na - sp	mmolc/L	22	1.14	0.138	0.981	0.135	0.024	0.089	1.36	0.125	1.2794	0.249	0.042	0.2157	6.33	0.513	5.4008
SAR - sp	value	19	0.480	0.070	0.48	0.110	0.014	0.08	0.840	0.050	0.88	0.121	0.012	0.13	2.97	0.190	2.81
Cl - sp	mmolc/L	15	0.80	0.160	0.4232	0.620	0.070	0.4564	0.950	0.132	0.5941 *L	1.20	0.200	0.9794	4.20	0.300	3.0365 *L
SO4 - sp	mmolc/L	16	1.68	0.140	1.0389 **L	0.861	0.106	0.538 *L	2.60	0.392	2.1801	0.643	0.150	0.4216	5.20	0.640	4.294
NO3 - sp	mmolc/L	10	5.26	0.910	5.1805	0.110	0.026	0	4.56	0.775	4.654 **L	4.57	0.868	4.4486	3.84	0.615	3.766
B - sp	mg/L	14	0.175	0.025		0.101	0.016		0.205	0.016		0.065	0.009		0.212	0.037	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	39	0.500	0.070	0.5566	0.272	0.028	0.2468	0.440	0.060	0.6163 *H	0.388	0.032	0.4737 *H	1.08	0.060	0.8716 *L
Soil EC (1:2)	(dS/m)	49	0.310	0.030	0.2896	0.146	0.024	0.1307	0.320	0.036	0.3599	0.250	0.019	0.2439	0.617	0.078	0.5286
pH (1:1) Water	Unit	92	7.62	0.075	7.39 *L	6.10	0.050	6.8 **H	6.35	0.045	6.67 **H	5.88	0.050	6.51 **H	8.10	0.080	8.04
pH (1:2) Water	Unit	30	7.72	0.114	7.53	6.21	0.080	6.94 **H	6.44	0.095	6.71 *H	5.95	0.090	6.27 *H	8.20	0.195	8.03
pH (1:1) 0.01M CaCl2	Unit	28	7.27	0.065		5.62	0.035		5.90	0.050		5.53	0.040		7.80	0.055	
pH (1:2) 0.01M CaCl2	Unit	7	7.25	0.130		5.70	0.130		5.92	0.030		5.58	0.080		7.71	0.010	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	27	7.47	0.040	7.52	6.69	0.100	6.58	6.92	0.084	6.81	6.98	0.070	6.82	7.55	0.050	7.56
Adams-Evans Buf pH	Unit	8	7.91	0.075		7.52	0.040		7.75	0.115		7.66	0.070		7.77	0.065	
Woodruff Buf. pH	Unit	23	7.07	0.020		6.61	0.030		6.75	0.040		6.75	0.030		7.17	0.020	
Mehlich Buffer pH	Unit	7	6.67	0.030		6.12	0.070		6.34	0.040		6.24	0.035		6.92	0.010	
Sikora Buffer pH	Unit	30	7.46	0.035		6.70	0.040		7.00	0.040		6.95	0.046		7.52	0.020	
Titrateable Acidity	cmol/kg	1	7.45	0.000		6.65	0.000		6.91	0.000		6.88	0.000		7.52	0.000	
Inorganic Nitrogen (NO3-N & NH4-N)																	
NO3-N Cd. Rd.	mg/kg	67	43.0	2.70	43.185	11.2	0.750	12.06	43.0	2.61	45.03	40.1	2.17	41.865	35.2	1.90	36.1
NO3-N ISE	mg/kg	9	48.8	3.20		12.1	0.900		47.3	1.30		41.0	2.33		40.0	5.00	
NO3-N CTA	mg/kg	2	40.2	4.85		13.3	2.02		42.1	6.43		39.4	5.19		31.9	4.45	
NO3-N Ion Chr.	mg/kg	1	33.7	0.000		8.39	0.00		33.0	0.000		31.3	0.000		21.0	0.000	
NO3-N Other	mg/kg	8	43.2	7.31		11.7	1.14		42.4	3.70		38.9	2.09		37.7	2.63	
NH4 - N (KCl Extr.)	mg/kg	53	17.5	1.19	18.69	51.9	4.84	61.45	71.3	5.80	85.31	7.74	0.575	9.16	3.71	0.509	3.4825
Phosphorus and Sulfur																	
PO4-P Bray P (1:10)	mg/kg	49	49.4	2.90	46.634	35.0	3.00	30.936	472	73.6	486.68	20.0	1.07	20.66	4.01	0.728	1.0917 **L
PO4-P Bray P1 (1:7)	mg/kg	6	43.0	2.63		27.2	3.33		420	36.6		18.7	1.36		3.98	1.91	
PO4-P Olsen/Bicarb	mg/kg	52	29.0	2.73	21.922 *L	25.2	1.59	11.397 **L	105	9.10	62.614 **L	12.9	1.05	7.4605 **L	11.6	1.50	7.1 *L
PO4-P AB-DTPA	mg/kg	4	21.1	0.447	20.828	13.7	1.67	11.02	75.4	3.57	70.492	9.67	0.986	7.9692	4.35	0.551	3.9928
PO4-P Modified Morgan	mg/kg	7	28.9	2.30		4.00	0.200		35.7	2.10		4.10	0.390		20.5	4.50	
PO4-P True Morgan	mg/kg	5	29.7	0.400		4.59	0.410		39.0	2.30		4.70	0.400		20.6	4.00	
PO4-P Mod. Kewlona	mg/kg																
PO4-P Stong Bray (1:10)	mg/kg	9	261	14.0		72.0	4.00		772	43.9		27.8	0.782		102	10.9	
PO4-P Water Soluble	mg/kg																
SO4 - S (PO4 Extr.)	mg/kg	34	10.7	2.41		7.00	1.68		19.3	2.80		6.10	1.30		47.8	4.70	

1 - Values flagged exceed Warning Limits " * " 2.5 x MAD (Median Absolute Deviation) and Control Limits " ** " 4 x MAD.
2 - Limits not compared to lab data for methods with less than 7 labs reporting.

Bases																					
K Ammonium Acetate	mg/kg	78	545	36.6	629.73	233	13.2	280.11	* H	441	29.5	555.62	* H	115	7.00	133.17	* H	528	31.4	614.27	* H
Ca Ammonium Acetate	mg/kg	75	1640	131	1347.3	2600	130	2470.1		908	52.0	844.6		1700	77.1	1614.7		6340	761	6132.4	
Mg Ammonium Acetate	mg/kg	75	295	19.5	238.46	* L	403	20.0	359.72	148	8.00	134.62		253	11.8	227.92		566	27.0	507.6	
Na Ammonium Acetate	mg/kg	64	29.0	3.53	28.821		11.3	2.60	10.102	33.0	4.14	38.412		12.4	2.37	12.801		286	19.5	311.75	
Bray Extractable K	mg/kg	6	509	33.4		167	15.2			373	15.6			89.0	5.35			327	24.9		
K- Olsen/Bicarb.	mg/kg	6	456	11.5		191	4.00			423	18.0			104	2.50			377	5.00		
K Modified Morgan	mg/kg	5	483	44.0		209	15.0			439	20.0			115	5.00			444	6.00		
K True Morgan	mg/kg	4	348	30.5		147	2.50			360	13.5			81.1	1.50			248	21.5		
Ca Modified Morgan	mg/kg	4	1610	71.5		2720	199			1030	29.0			1780	83.0			17200	4330		
Aluminum KCL Extr.	mg/kg	6	0.728	0.452		0.656	0.144			0.741	0.625			0.600	0.080			0.648	0.130		

Mehlich-1 Multi Element (scoop)																					
Scoop Soil Mass	g	5	5.00	0.000		5.00	0.000			5.00	0.000			5.00	0.000			5.00	0.000		
P	mg/kg	8	240	21.7		14.7	1.42			433	45.4			15.9	1.85			6.81	0.995		
K	mg/kg	8	406	18.9		147	6.37			359	21.7			74.1	2.85			157	11.3		
Ca	mg/kg	8	1970	40.8		2310	34.7			1540	127			1440	77.9			5210	546		
Mg	mg/kg	8	291	14.7		323	10.9			154	7.45			213	2.30			353	24.0		
Mn	mg/kg	6	56.2	1.83		125	3.48			44.8	3.49			88.0	6.50			3.44	0.600		
Zn	mg/kg	6	6.61	0.578		1.97	0.140			18.7	0.486			1.95	0.141			0.127	0.099		

Mehlich-3 Multi-Element (scoop)																						
Scoop Soil Mass	g	23	2.27	0.070		1.87	0.100			1.84	0.090			1.91	0.110			2.16	0.080			
Assumed Density	g/cm ³	18	1.15	0.043		0.944	0.050			0.938	0.068			1.02	0.083			1.11	0.066			
Volume of Scoop	cm ³	25	2.00	0.000		2.00	0.000			2.00	0.000			2.00	0.000			2.00	0.000			
Extractant Volume mL	mL	19	20.0	0.000		20.0	0.000			20.0	0.000			20.0	0.000			20.0	0.000			
P Colorimetric	mg/kg	10	64.5	2.60		45.9	1.33			577	131			22.9	1.62			49.9	4.75			
P ICP-AES	mg/kg	48	69.2	3.82	50.732	** L	51.9	3.11	44.598	684	33.2	574.22	* L	28.1	1.97	21.474	* L	52.7	3.58	47.751		
K	mg/kg	52	588	35.8	551.33		232	9.5	234.11	444	19.3	484.16		112	7.48	113.93		538	29.1	526.19		
Ca	mg/kg	49	1900	106	1428.1	** L	2800	114	2266.7	** L	1380	58.0	1134.9	** L	1800	91.4	1441.4	* L	8520	519	6849.9	* L
Mg	mg/kg	49	353	17.5	265.69	** L	409	16.8	328.78	** L	168	9.43	140.4	* L	261	17.7	207.18	* L	703	31.1	604.53	* L
Na	mg/kg	35	27.3	3.17	28.177		12.0	1.75	9.2922	38.6	3.76	40.443		12.1	1.84	12.273		294	16.5	295.27		
S	mg/kg	41	18.0	1.56	11.697	** L	13.9	1.29	9.2528	* L	32.6	1.98	26.968	* L	10.1	1.09	6.2651	* L	87.8	4.71	70.088	* L
Al	mg/kg	32	395	19.6	335.73	* L	640	40.2	527.39	* L	952	67.6	834.29		526	35.3	408.88	* L	267	32.1	50.964	** L
Zn	mg/kg	44	8.29	0.375	6.4372	** L	2.10	0.230	1.7003	21.7	0.910	19.398		2.52	0.180	1.8546	* L	2.50	0.150	2.1386		
Mn	mg/kg	44	83.9	4.18	70.608	* L	140	7.55	115.18	* L	42.8	2.63	37.27	150	12.3	118.09	* L	131	13.6	130.79		
Fe	mg/kg	43	101	8.35	81.052		492	48.0	437.83	428	30.8	385.3		198	12.3	148.91	* L	75.8	5.54	69.263		
Cu	mg/kg	44	2.20	0.130	1.934		2.31	0.430	2.7182	25.2	1.55	24.28		1.47	0.155	1.1663		3.34	0.223	2.9736		
B	mg/kg	36	0.973	0.117	1.009		0.825	0.168	0.6442	0.900	0.165	0.8969		0.445	0.080	0.4645		2.57	0.250	2.6892		

Micronutrients																						
Zn - DTPA	mg/kg	65	3.55	0.290	3.236	1.65	0.120	1.378		7.20	0.510	7.5176		1.57	0.118	1.4074		0.840	0.060	0.8491		
Mn - DTPA	mg/kg	51	33.5	2.50	31.388	137	14.4	118		26.0	1.80	26.27		79.7	4.78	74.7		6.00	1.05	5.6314		
Fe - DTPA	mg/kg	53	12.7	1.30	11.949	245	27.6	221.02		141	16.1	155.36		58.3	6.06	56.46		12.2	1.62	12.028		
Cu - DTPA	mg/kg	54	1.00	0.100	0.8819	2.89	0.175	2.5404		20.0	1.07	20.556		1.00	0.075	0.8737		1.44	0.140	1.3481		
Zn - HCl	mg/kg	2	8.96	0.060		2.86	0.155			20.8	0.10			2.51	0.210			0.010	0.000			
Mn-H3PO4	mg/kg	12	44.8	1.91		98.3	6.19			41.5	2.10			73.1	4.67			3.73	0.749			
Cl - Ca(NO3)2 Extr.	mg/kg	15	10.1	1.12		9.30	1.30			12.7	1.65			18.5	2.30			70.0	6.80			
B - Hot Wat.	mg/kg	33	0.599	0.107	0.169	* L	0.570	0.095	0.1636	** L	0.672	0.168	0.2291	* L	0.305	0.075	0.1118	* L	1.19	0.280	0.6194	
B-DTPA/Sorbitol	mg/kg	17	0.454	0.054		0.501	0.076			0.450	0.085			0.195	0.025			1.80	0.130			

Soil Organic Matter																					
Soil Kjeldahl N	%	18	0.083	0.004		0.172	0.012			0.172	0.009			0.124	0.007			0.076	0.006		
Soil TN (combustion)	%	39	0.090	0.010		0.186	0.013			0.180	0.010			0.127	0.009			0.087	0.014		
Soil TOC (Combustion)	%	11	0.840	0.060	0.7446	2.30	0.080	2.202		1.66	0.064	1.4562	* L	1.28	0.040	1.1546	* L	0.800	0.050	0.7742	
Soil Total C (Combustion)	%	32	0.926	0.044	0.9887	2.29	0.090	2.4206		1.75	0.088	1.8731		1.31	0.052	1.2628		1.51	0.060	1.4015	

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SOM - Walkley-Black	%	27	1.65	0.150	1.3541		3.73	0.190	3.6263		3.00	0.105	2.7547		2.10	0.180	1.9455		1.31	0.100	0.9805	* L
SOM - LOI (% Wt loss)	%	72	1.94	0.101	1.6763	* L	4.26	0.155	3.7935	* L	3.27	0.130	2.933	* L	2.60	0.100	2.114	** L	2.21	0.220	1.5157	* L
Other																						
CaCO3 Content	%	11	0.805	0.121	0.917		0.500	0.074	0.912	** H	0.444	0.077	0.458		0.505	0.121	0.601		7.10	0.558	7.715	
CEC - Cation Displacement	cmol/kg	16	11.3	1.34	11.754		23.6	2.66	29.727		10.2	2.05	13.151		14.5	2.04	18.517		26.9	3.20	34.926	* H
CEC - Estimation	cmol/kg	13	12.4	1.30			20.5	1.50			8.75	1.40			12.2	1.35			41.0	8.20		
Soil Density (Scoop)	g/cc	12	1.32	0.027			1.08	0.019			1.13	0.035			1.11	0.031			1.25	0.018		
Particle Size Analysis-Hydrometer																						
Sand 2000 - 50 um	%	32	77.6	2.85	68	* L	12.9	2.09	4	** L	33.0	2.36	26	* L	14.6	2.64	4	* L	25.5	4.10	16	
Silt 50 - 2 um	%	32	16.0	2.85	24	* H	59.4	3.10	68	* H	52.3	3.63	60		65.0	3.70	76	* H	30.8	3.45	38	
Clay 2 - 0 um	%	32	7.00	0.957	8		28.0	3.10	28		14.0	3.00	14		20.0	3.00	20		45.0	4.38	46	
Particle Size Analysis- Pipette																						
Sand 2000 - 50 um	%	5	80.9	4.50			7.50	2.50			29.0	2.70			7.50	3.50			21.0	1.00		
Silt 50 - 2 um	%	5	12.2	3.81			69.0	2.60			58.4	0.440			72.5	5.50			33.4	0.900		
Clay 2 - 0 um	%	5	7.00	0.500			27.4	0.440			13.5	1.48			18.0	1.18			46.3	1.26		
Solvita CO2																						
Solvita CO2	ppm	5	82.0	7.00			148	12.6			116	11.8			94.0	12.0			52.0	5.17		

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