



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

Laboratory ID
352129

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}	Median	MAD	Lab ^{1,2}		
Salinity																						
Sat. Paste Moisture	%	20	38.5	2.34	33.1	48.5	2.94	47	43.4	3.09	39.2	44.2	3.50	40.7	56.1	3.10	55.2					
pH - sp	Unit	29	7.43	0.110	7.1	*L	5.96	0.100	5.4	**L	6.21	0.110	5.6	**L	5.80	0.160	5	**L	7.80	0.110	7.3	**L
ECe - sp	dS/m	26	1.35	0.084	1.8	**H	0.365	0.065	0.4		1.18	0.118	1.5	*H	0.830	0.120	1.1		1.66	0.090	1.8	
HCO3 - sp	mmolc/L	10	4.29	0.607	4.23		1.60	0.234		1.54	0.237	1.09		0.900	0.100	0.59	*L	3.08	0.394	3.51		
Ca - sp	mmolc/L	21	7.45	0.660	9.67	*H	2.17	0.310	2.48		3.35	0.450	4.35		4.82	0.735	6.68	*H	7.45	0.769	8.54	
Mg - sp	mmolc/L	21	3.49	0.463	4.74	*H	0.880	0.110	0.96		1.75	0.292	2.37		1.89	0.242	2.61	*H	1.86	0.221	2.13	
Na - sp	mmolc/L	22	1.14	0.138	1.51	*H	0.135	0.024	0.25	**H	1.36	0.125	1.67	*H	0.249	0.042	0.41	*H	6.33	0.513	7.43	
SAR - sp	value	19	0.480	0.070	0.56		0.110	0.014	0.19	**H	0.840	0.050	0.91		0.121	0.012	0.19	**H	2.97	0.190	3.22	
Cl - sp	mmolc/L	15	0.80	0.160	0.91		0.620	0.070	0.822	*H	0.950	0.132	0.75		1.20	0.200	1.41		4.20	0.300	4.36	
SO4 - sp	mmolc/L	16	1.68	0.140	1.7		0.861	0.106	0.765		2.60	0.392	2.58		0.643	0.150	0.65		5.20	0.640	5.85	
NO3 - sp	mmolc/L	10	5.26	0.910	7.9	*H	0.110	0.026	0.0052	**L	4.56	0.775	6.76	*H	4.57	0.868	6.92	*H	3.84	0.615	5	
B - sp	mg/L	14	0.175	0.025	0.168		0.101	0.016	0.098		0.205	0.016	0.188		0.065	0.009			0.212	0.037	0.217	
Soil pH & EC																						
Soil EC (1:1)	(dS/m)	39	0.500	0.070	0.6		0.272	0.028	0.3		0.440	0.060	0.8	**H	0.388	0.032	0.5	*H	1.08	0.060	1	
Soil EC (1:2)	(dS/m)	49	0.310	0.030	0.3		0.146	0.024	0.1		0.320	0.036	0.3		0.250	0.019	0.2	*L	0.617	0.078	0.6	
pH (1:1) Water	Unit	92	7.62	0.075	7	**L	6.10	0.050	5.3	**L	6.35	0.045	5.6	**L	5.88	0.050	5	**L	8.10	0.080	7.4	**L
pH (1:2) Water	Unit	30	7.72	0.114	7.1	**L	6.21	0.080	5.3	**L	6.44	0.095	5.7	**L	5.95	0.090	5.2	**L	8.20	0.195	7.7	*L
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	7.3	**L	6.69	0.100	6.9		6.92	0.084	7.1		6.98	0.070			7.55	0.050	7.5	
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			11.2	0.750			43.0	2.61			40.1	2.17			35.2	1.90		
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	39		11.7	1.14	12		42.4	3.70	41		38.9	2.09	39		37.7	2.63	34	
NH4 - N (KCl Extr.)	mg/kg	53	17.5	1.19	20		51.9	4.84	121	**H	71.3	5.80	141	**H	7.74	0.575	14	**H	3.71	0.509	7.6	**H
Phosphorus and Sulfur																						
PO4-P Bray P (1:10)	mg/kg	49	49.4	2.90			35.0	3.00			472	73.6			20.0	1.07			4.01	0.728		
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	23		25.2	1.59	17	**L	105	9.10	78	*L	12.9	1.05	9.02	*L	11.6	1.50	8.34	
PO4-P AB-DTPA	mg/kg	4	21.1	0.447	20.4		13.7	1.67	13		75.4	3.57	73.2		9.67	0.986	9.4		4.35	0.551	4.7	
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		

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Bases																					
K Ammonium Acetate	mg/kg	78	545	36.6	645	* H	233	13.2	271	* H	441	29.5	526	* H	115	7.00	130	528	31.4	628	* H
Ca Ammonium Acetate	mg/kg	75	1640	131	1470		2600	130	2440		908	52.0	834		1700	77.1	1600	6340	761	7580	
Mg Ammonium Acetate	mg/kg	75	295	19.5	278		403	20.0	411		148	8.00	144		253	11.8	251	566	27.0	557	
Na Ammonium Acetate	mg/kg	64	29.0	3.53	30		11.3	2.60	9.957		33.0	4.14	37		12.4	2.37	12	286	19.5	345	* H
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	0.311		0.656	0.144	0.656		0.741	0.625	0.581		0.600	0.080	0.63	0.648	0.130	0.636	

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			51.9	3.11			684	33.2			28.1	1.97		52.7	3.58		
K	mg/kg	52	588	35.8			232	9.5			444	19.3			112	7.48		538	29.1		
Ca	mg/kg	49	1900	106			2800	114			1380	58.0			1800	91.4		8520	519		
Mg	mg/kg	49	353	17.5			409	16.8			168	9.43			261	17.7		703	31.1		
Na	mg/kg	35	27.3	3.17			12.0	1.75			38.6	3.76			12.1	1.84		294	16.5		
S	mg/kg	41	18.0	1.56			13.9	1.29			32.6	1.98			10.1	1.09		87.8	4.71		
Al	mg/kg	32	395	19.6			640	40.2			952	67.6			526	35.3		267	32.1		
Zn	mg/kg	44	8.29	0.375			2.10	0.230			21.7	0.910			2.52	0.180		2.50	0.150		
Mn	mg/kg	44	83.9	4.18			140	7.55			42.8	2.63			150	12.3		131	13.6		
Fe	mg/kg	43	101	8.35			492	48.0			428	30.8			198	12.3		75.8	5.54		
Cu	mg/kg	44	2.20	0.130			2.31	0.430			25.2	1.55			1.47	0.155		3.34	0.223		
B	mg/kg	36	0.973	0.117			0.825	0.168			0.900	0.165			0.445	0.080		2.57	0.250		

Micronutrients																					
Zn - DTPA	mg/kg	65	3.55	0.290	2.87		1.65	0.120	1.8		7.20	0.510	7.4		1.57	0.118	1.6	0.840	0.060	0.785	
Mn - DTPA	mg/kg	51	33.5	2.50	29		137	14.4	147		26.0	1.80	26.8		79.7	4.78	84.2	6.00	1.05	3.4	
Fe - DTPA	mg/kg	53	12.7	1.30	8.67	* L	245	27.6	262		141	16.1	163		58.3	6.06	66	12.2	1.62	6.15	* L
Cu - DTPA	mg/kg	54	1.00	0.100	0.76		2.89	0.175	3		20.0	1.07	21.9		1.00	0.075	1	1.44	0.140	1.3	
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	0.168	** L	0.570	0.095	0.115	** L	0.672	0.168	0.238	* L	0.305	0.075	0.0655	* L	1.19	0.280	
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	0.109	** H	0.172	0.012	0.208	* H	0.172	0.009	0.214	** H	0.124	0.007	0.144	* H	0.076	0.006	0.0847
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	0.62	* L	2.30	0.080	2.33		1.66	0.064			1.28	0.040	1.31	0.800	0.050	0.83	
Soil Total C (Combustion)	%	32	0.926	0.044	0.87		2.29	0.090	2.32		1.75	0.088			1.31	0.052	1.32	1.51	0.060	1.56	

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SOM - Walkley-Black	%	27	1.65	0.150	1.9		3.73	0.190	4.3	* H	3.00	0.105		2.10	0.180	2.5		1.31	0.100	1.9	** H
SOM - LOI (% Wt loss)	%	72	1.94	0.101	2.8	** H	4.26	0.155	5.8	** H	3.27	0.130		2.60	0.100	3.8	** H	2.21	0.220	5.6	** H
Other																					
CaCO3 Content	%	11	0.805	0.121	1.1		0.500	0.074	0.5		0.444	0.077	0.4	0.505	0.121	0.5		7.10	0.558	7.5	
CEC - Cation Displacement	cmol/kg	16	11.3	1.34	9.24		23.6	2.66	21.1		10.2	2.05	9.72	14.5	2.04	12.1		26.9	3.20	23	
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	67	* L	12.9	2.09	4	** L	33.0	2.36	25	* L	14.6	2.64	5	* L	25.5	4.10	
Silt 50 - 2 um	%	32	16.0	2.85	26	* H	59.4	3.10	73	** H	52.3	3.63	62	* H	65.0	3.70	79	* H	30.8	3.45	
Clay 2 - 0 um	%	32	7.00	0.957	7		28.0	3.10	23		14.0	3.00	13		20.0	3.00	16		45.0	4.38	
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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