



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

Laboratory ID  
**General**

Soil Analysis	Units	n	Soil 2018-111		Soil 2018-112		Soil 2018-113		Soil 2018-114		Soil 2018-115	
			Median	MAD	Median	MAD	Median	MAD	Median	MAD	Median	MAD
<b>Salinity</b>												
Sat. Paste Moisture	%	20	38.5	2.34	48.5	2.94	43.4	3.09	44.2	3.50	56.1	3.10
pH - sp	Unit	29	7.43	0.110	5.96	0.100	6.21	0.110	5.80	0.160	7.80	0.110
ECe - sp	dS/m	26	1.35	0.084	0.365	0.065	1.18	0.118	0.830	0.120	1.66	0.090
HCO3 - sp	mmolc/L	10	4.29	0.607	1.60	0.234	1.54	0.237	0.900	0.100	3.08	0.394
Ca - sp	mmolc/L	21	7.45	0.660	2.17	0.310	3.35	0.450	4.82	0.735	7.45	0.769
Mg - sp	mmolc/L	21	3.49	0.463	0.880	0.110	1.75	0.292	1.89	0.242	1.86	0.221
Na - sp	mmolc/L	22	1.14	0.138	0.135	0.024	1.36	0.125	0.249	0.042	6.33	0.513
SAR - sp	value	19	0.480	0.070	0.110	0.014	0.840	0.050	0.121	0.012	2.97	0.190
Cl - sp	mmolc/L	15	0.80	0.160	0.620	0.070	0.950	0.132	1.20	0.200	4.20	0.300
SO4 - sp	mmolc/L	16	1.68	0.140	0.861	0.106	2.60	0.392	0.643	0.150	5.20	0.640
NO3 - sp	mmolc/L	10	5.26	0.910	0.110	0.026	4.56	0.775	4.57	0.868	3.84	0.615
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
<b>Soil pH &amp; EC</b>												
Soil EC (1:1)	(dS/m)	39	0.500	0.070	0.272	0.028	0.440	0.060	0.388	0.032	1.08	0.060
Soil EC (1:2)	(dS/m)	49	0.310	0.030	0.146	0.024	0.320	0.036	0.250	0.019	0.617	0.078
pH (1:1) Water	Unit	92	7.62	0.075	6.10	0.050	6.35	0.045	5.88	0.050	8.10	0.080
pH (1:2) Water	Unit	30	7.72	0.114	6.21	0.080	6.44	0.095	5.95	0.090	8.20	0.195
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
<b>Buffer pH, Lime Req.</b>												
SMP Buffer pH	Unit	27	7.47	0.040	6.69	0.100	6.92	0.084	6.98	0.070	7.55	0.050
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
<b>Inorganic Nitrogen (NO3-N &amp; NH4-N)</b>												
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	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	51.9	4.84	71.3	5.80	7.74	0.575	3.71	0.509
<b>Phosphorus and Sulfur</b>												
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	25.2	1.59	105	9.10	12.9	1.05	11.6	1.50
PO4-P AB-DTPA	mg/kg	4	21.1	0.447	13.7	1.67	75.4	3.57	9.67	0.986	4.35	0.551
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	233	13.2	441	29.5	115	7.00	528	31.4
Ca Ammonium Acetate	mg/kg	75	1640	131	2600	130	908	52.0	1700	77.1	6340	761
Mg Ammonium Acetate	mg/kg	75	295	19.5	403	20.0	148	8.00	253	11.8	566	27.0
Na Ammonium Acetate	mg/kg	64	29.0	3.53	11.3	2.60	33.0	4.14	12.4	2.37	286	19.5
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 <sup>3</sup>	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 <sup>3</sup>	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	1.65	0.120	7.20	0.510	1.57	0.118	0.840	0.060
Mn - DTPA	mg/kg	51	33.5	2.50	137	14.4	26.0	1.80	79.7	4.78	6.00	1.05
Fe - DTPA	mg/kg	53	12.7	1.30	245	27.6	141	16.1	58.3	6.06	12.2	1.62
Cu - DTPA	mg/kg	54	1.00	0.100	2.89	0.175	20.0	1.07	1.00	0.075	1.44	0.140
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	0.570	0.095	0.672	0.168	0.305	0.075	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	0.172	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	2.30	0.080	1.66	0.064	1.28	0.040	0.800	0.050
Soil Total C (Combustion)	%	32	0.926	0.044	2.29	0.090	1.75	0.088	1.31	0.052	1.51	0.060

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

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