



**2017 North American Proficiency Testing Program  
1st Quarter Report - April 14, 2017**

**Laboratory ID  
General**

Soil Analysis	Units	n	Soil 2017-101			Soil 2017-102			Soil 2017-103			Soil 2017-104			Soil 2017-105		
			Median	MAD	Lab <sup>1,2</sup>	Median	MAD	Lab <sup>1,2</sup>	Median	MAD	Lab <sup>1,2</sup>	Median	MAD	Lab <sup>1,2</sup>	Median	MAD	Lab <sup>1,2</sup>
<b>Salinity</b>																	
Sat. Paste Moisture	%	22	47.5	3.20		45.1	2.40		40.1	2.65		55.6	3.68		31.2	2.26	
pH - sp	Unit	28	6.13	0.230		6.75	0.075		5.77	0.085		7.19	0.080		7.35	0.090	
ECe - sp	dS/m	29	1.01	0.070		0.680	0.080		1.08	0.190		0.630	0.041		3.62	0.550	
HCO <sub>3</sub> - sp	mmolc/L	12	6.06	1.03		2.40	0.320		0.416	0.045		4.23	0.503		2.03	0.257	
Ca - sp	mmolc/L	26	9.52	1.56		4.22	0.405		5.10	0.815		3.47	0.300		25.9	2.41	
Mg - sp	mmolc/L	26	1.88	0.295		1.88	0.219		2.25	0.485		1.97	0.220		7.50	1.38	
Na - sp	mmolc/L	26	0.565	0.080		0.096	0.014		0.325	0.075		0.122	0.016		0.200	0.033	
SAR - sp	value	24	0.230	0.042		0.060	0.010		0.185	0.040		0.080	0.010		0.050	0.007	
Cl - sp	mmolc/L	15	0.358	0.058		0.170	0.021		0.320	0.060		0.316	0.033		1.05	0.180	
SO <sub>4</sub> - sp	mmolc/L	16	2.46	0.410		0.605	0.060		0.320	0.045		0.675	0.082		2.52	0.420	
NO <sub>3</sub> - sp	mmolc/L	9	1.74	0.360		2.77	0.582		7.90	0.820		0.033	0.008		26.0	5.79	
B - sp	mg/L	15	0.034	0.005		0.170	0.030		0.060	0.010		0.112	0.019		0.229	0.021	
<b>Soil pH &amp; EC</b>																	
Soil EC (1:1)	(dS/m)	40	0.278	0.050		0.290	0.039		0.370	0.070		0.320	0.025		1.06	0.215	
Soil EC (1:2)	(dS/m)	46	0.202	0.037		0.193	0.023		0.272	0.041		0.240	0.040		0.750	0.098	
pH (1:1) Water	Unit	94	6.03	0.135		6.85	0.060		5.89	0.062		7.47	0.080		7.60	0.075	
pH (1:2) Water	Unit	29	6.10	0.100		6.92	0.080		5.97	0.080		7.58	0.110		7.65	0.130	
pH (1:1) 0.01M CaCl <sub>2</sub>	Unit	24	5.75	0.105		6.50	0.040		5.54	0.035		6.95	0.055		7.41	0.090	
pH (1:2) 0.01M CaCl <sub>2</sub>	Unit	10	5.80	0.150		6.47	0.075		5.55	0.050		6.95	0.065		7.37	0.095	
<b>Buffer pH, Lime Req.</b>																	
SMP Buffer pH	Unit	29	6.73	0.150		7.28	0.080		6.60	0.070		7.29	0.043		7.56	0.044	
Adams-Evans Buf pH	Unit	11	7.54	0.030		7.80	0.030		7.48	0.040		7.74	0.035		7.96	0.035	
Woodruff Buf. pH	Unit	23	6.70	0.080		6.97	0.030		6.53	0.030		7.03	0.030		7.06	0.040	
Mehlich Buffer pH	Unit	11	6.18	0.090		6.50	0.050		6.08	0.010		6.58	0.060		6.68	0.070	
Sikora Buffer pH	Unit	31	6.76	0.110		7.30	0.040		6.62	0.080		7.28	0.040		7.57	0.050	
Titrateable Acidity	cmol/kg																

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### Inorganic Nitrogen (NO3-N & NH4-N)

<b>NO3-N Cd. Rd.</b>	mg/kg	68	<b>14.0</b>	1.30		<b>25.7</b>	1.55		<b>54.0</b>	2.67		<b>2.50</b>	0.460		<b>152</b>	13.5
<b>NO3-N ISE</b>	mg/kg	14	<b>14.5</b>	1.55		<b>26.8</b>	3.15		<b>53.5</b>	4.60		<b>3.50</b>	0.365		<b>177</b>	27.9
<b>NO3-N CTA</b>	mg/kg	2	<b>15.4</b>	0.56		<b>26.3</b>	2.59		<b>51.0</b>	5.09		<b>5.33</b>	0.648		<b>126</b>	24.0
<b>NO3-N Ion Chr.</b>	mg/kg	2	<b>6.22</b>	6.08		<b>20.6</b>	2.27		<b>72.7</b>	21.9		<b>1.01</b>	0.873		<b>252</b>	110
<b>NO3-N Other _____</b>	mg/kg	8	<b>12.8</b>	1.53		<b>25.3</b>	2.56		<b>49.3</b>	7.16		<b>3.30</b>	0.308		<b>169</b>	10.8
<b>NH4 - N (KCl Extr.)</b>	mg/kg	59	<b>9.35</b>	1.25		<b>3.88</b>	0.670		<b>18.6</b>	1.70		<b>6.40</b>	0.880		<b>2.09</b>	0.271

### Phosphorus and Sulfur

<b>PO4-P Bray P (1:10)</b>	mg/kg	52	<b>25.5</b>	2.46		<b>20.4</b>	1.72		<b>156</b>	14.0		<b>195</b>	20.5		<b>73.2</b>	6.80
<b>PO4-P Bray P1 (1:7)</b>	mg/kg	5	<b>21.6</b>	1.09		<b>17.7</b>	0.910		<b>92.6</b>	11.7		<b>166</b>	3.03		<b>54.8</b>	5.75
<b>PO4-P Olsen/Bicarb</b>	mg/kg	55	<b>12.1</b>	1.10		<b>12.1</b>	0.900		<b>51.5</b>	4.69		<b>128</b>	14.0		<b>32.4</b>	4.08
<b>PO4-P AB-DTPA</b>	mg/kg	3	<b>12.9</b>	1.87		<b>12.7</b>	1.99		<b>24.7</b>	1.49		<b>84.6</b>	24.5		<b>28.4</b>	0.158
<b>PO4-P Modified Morgan</b>	mg/kg	8	<b>2.35</b>	0.405		<b>12.7</b>	1.60		<b>6.30</b>	0.450		<b>96.5</b>	6.75		<b>50.4</b>	5.85
<b>PO4-P True Morgan</b>	mg/kg	7	<b>2.00</b>	0.180		<b>12.3</b>	0.900		<b>6.80</b>	0.320		<b>102</b>	12.2		<b>51.1</b>	4.20
<b>PO4-P Mod. Kewlona</b>	mg/kg	1	<b>19.0</b>	0.000		<b>15.0</b>	0.000		<b>75.0</b>	0.000		<b>200</b>	0.000		<b>47.0</b>	0.000
<b>PO4-P Stong Bray (1:10)</b>	mg/kg	9	<b>32.0</b>	1.50		<b>61.0</b>	8.75		<b>333</b>	14.8		<b>379</b>	17.0		<b>104</b>	7.70
<b>PO4-P Water Soluble</b>	mg/kg															
<b>SO4 - S (PO4 Extr.)</b>	mg/kg	36	<b>19.3</b>	4.38		<b>5.00</b>	0.823		<b>9.27</b>	2.08		<b>6.34</b>	1.04		<b>16.0</b>	3.40

### Bases

<b>K Ammonium Acetate</b>	mg/kg	79	<b>97.1</b>	10.6		<b>235</b>	13.4		<b>285</b>	18.0		<b>1110</b>	86.1		<b>202</b>	22.6
<b>Ca Ammonium Acetate</b>	mg/kg	75	<b>1380</b>	201		<b>1930</b>	122		<b>878</b>	69.0		<b>3660</b>	296		<b>966</b>	109
<b>Mg Ammonium Acetate</b>	mg/kg	75	<b>91.0</b>	7.86		<b>282</b>	12.8		<b>113</b>	8.65		<b>602</b>	43.5		<b>100</b>	13.5
<b>Na Ammonium Acetate</b>	mg/kg	61	<b>18.2</b>	3.78		<b>9.60</b>	1.57		<b>12.8</b>	3.20		<b>11.0</b>	1.75		<b>8.00</b>	1.14
<b>Bray Extractable K</b>	mg/kg	6	<b>82.9</b>	4.45		<b>208</b>	3.35		<b>233</b>	14.1		<b>797</b>	53.0		<b>234</b>	7.90
<b>K- Olsen/Bicarb.</b>	mg/kg	6	<b>107</b>	7.46		<b>226</b>	9.50		<b>285</b>	4.09		<b>979</b>	13.0		<b>192</b>	5.50
<b>K Modified Morgan</b>	mg/kg	5	<b>100</b>	6.50		<b>219</b>	23.0		<b>272</b>	11.5		<b>1060</b>	84.5		<b>181</b>	24.0
<b>K True Morgan</b>	mg/kg	5	<b>82.0</b>	1.80		<b>199</b>	12.0		<b>257</b>	4.00		<b>796</b>	17.0		<b>166</b>	14.0
<b>Ca Modified Morgan</b>	mg/kg	4	<b>2120</b>	204		<b>1980</b>	250		<b>911</b>	74.0		<b>6050</b>	838		<b>1300</b>	163
<b>Aluminum KCL Extr.</b>	mg/kg	5	<b>1.00</b>	0.200		<b>0.700</b>	0.320		<b>3.00</b>	1.10		<b>0.600</b>	0.400		<b>2.00</b>	0.600

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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	5.00	0.000
P	mg/kg	8	12.4	1.66	55.7	7.28	73.5	12.0	145	20.2	108	11.1		
K	mg/kg	8	74.1	2.96	182	22.3	240	12.8	641	60.1	206	18.5		
Ca	mg/kg	8	1790	87.5	2170	283	1170	76.9	4330	474	1640	179		
Mg	mg/kg	8	94.3	3.67	287	35.4	121	4.51	631	69.3	131	10.8		
Mn	mg/kg	7	80.5	5.71	47.8	3.31	102	9.75	84.5	9.74	33.2	0.830		
Zn	mg/kg	7	2.07	0.125	2.55	0.381	4.09	0.388	2.41	0.861	2.04	0.316		
Mehlich-3 Multi-Element (scoop)														
Scoop Soil Mass	g	28	1.85	0.175	2.20	0.079	2.23	0.110	1.88	0.090	2.66	0.090		
Assumed Density	g/cm3	17	0.932	0.102	1.10	0.060	1.12	0.075	0.953	0.057	1.32	0.045		
Volume of Scoop	cm3	27	2.00	0.000	2.00	0.000	2.00	0.000	2.00	0.000	2.00	0.000		
Extractant Volume mL	mL	25	20.0	0.000	20.0	0.000	20.0	0.000	20.0	0.000	20.0	0.000		
P Colorimetric	mg/kg	13	22.5	2.30	22.6	2.85	141	9.90	243	15.8	77.0	2.20		
P ICP-AES	mg/kg	52	35.6	1.70	33.4	2.52	146	11.5	266	16.6	90.6	8.36		
K	mg/kg	58	99.4	11.2	238	12.2	277	16.9	1070	60.7	241	24.5		
Ca	mg/kg	56	1640	167	2230	95	1020	76.4	4570	340	1380	128		
Mg	mg/kg	56	101	8.65	323	15.5	125	8.21	676	37.0	135	12.9		
Na	mg/kg	45	17.3	2.55	8.00	1.39	13.6	2.60	11.0	2.30	7.53	1.38		
S	mg/kg	47	32.4	3.40	11.1	1.15	20.0	2.03	14.0	1.47	24.9	2.90		
Al	mg/kg	35	943	59.0	267	23.0	1630	140	266	39.7	137	15.0		
Zn	mg/kg	51	2.39	0.228	3.36	0.241	4.08	0.280	6.77	0.520	2.51	0.270		
Mn	mg/kg	52	111	8.59	167	15.2	100	4.99	121	13.0	81.6	8.35		
Fe	mg/kg	51	133	10.5	94.2	9.50	210	17.7	343	35.3	46.2	5.88		
Cu	mg/kg	52	0.750	0.150	0.890	0.125	2.71	0.170	3.32	0.315	0.312	0.027		
B	mg/kg	40	0.300	0.070	1.60	0.210	0.700	0.100	1.53	0.180	0.850	0.193		

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Micronutrients													
Zn - DTPA	mg/kg	66	1.50	0.200	1.70	0.100	2.01	0.165	3.90	0.305	0.800	0.100	
Mn - DTPA	mg/kg	53	56.7	4.52	28.2	4.38	75.7	4.77	15.0	1.92	5.77	0.970	
Fe - DTPA	mg/kg	56	49.4	6.35	23.8	3.00	117	18.0	70.4	8.31	6.70	0.900	
Cu - DTPA	mg/kg	56	0.493	0.058	0.300	0.030	1.80	0.160	2.45	0.235	0.100	0.014	
Zn - HCl	mg/kg	4	2.39	0.185	3.58	0.130	4.68	0.250	8.19	0.560	2.51	0.240	
Mn-H3PO4	mg/kg	9	71.0	5.98	35.7	1.37	82.0	6.24	68.6	14.0	25.0	0.440	
Cl - Ca(NO3)2 Extr.	mg/kg	18	5.67	0.789	2.66	0.315	4.80	0.568	4.80	0.719	12.6	2.70	
B - Hot Wat.	mg/kg	32	0.218	0.036	0.895	0.135	0.450	0.050	0.920	0.170	0.448	0.079	
B-DTPA/Sorbitol	mg/kg	17	0.190	0.030	0.630	0.060	0.300	0.047	0.720	0.060	0.360	0.050	
Soil Organic Matter													
Soil Kjeldahl N	%	19	0.150	0.010	0.170	0.010	0.200	0.010	0.290	0.014	0.060	0.010	
Soil TN (combustion)	%	39	0.153	0.013	0.177	0.012	0.210	0.010	0.290	0.018	0.060	0.010	
Soil TOC (Combustion)	%	10	1.67	0.130	1.76	0.184	2.46	0.070	3.67	0.178	0.418	0.022	
Soil Total C (Combustion)	%	30	1.71	0.032	1.90	0.084	2.37	0.077	3.87	0.110	0.460	0.026	
SOM - Walkley-Black	%	25	2.82	0.234	3.25	0.150	4.40	0.290	6.01	0.420	0.774	0.096	
SOM - LOI (% Wt loss)	%	81	3.70	0.130	3.00	0.150	4.90	0.150	6.10	0.210	0.775	0.070	
Other													
CaCO3 Content	%	10	0.792	0.166	0.700	0.120	0.600	0.130	2.80	0.187	0.560	0.104	
CEC - Cation Displacement	cmol/kg	18	11.0	1.77	12.7	2.70	11.6	1.98	24.9	3.90	2.70	0.310	
CEC - Estimation	cmol/kg	13	10.6	2.44	13.3	0.890	11.0	1.10	27.0	1.25	7.00	0.640	
Soil Density (Scoop)	g/cc	11	1.03	0.053	1.24	0.040	1.28	0.040	1.09	0.030	1.50	0.060	
Particle Size Analysis-Hydrometer													
Sand 2000 - 50 um	%	35	16.3	3.50	82.5	2.30	63.9	3.10	40.2	5.20	92.0	2.00	
Silt 50 - 2 um	%	35	58.0	4.00	9.20	1.80	27.0	3.00	41.6	3.60	3.90	0.475	
Clay 2 - 0 um	%	35	24.0	4.00	8.01	1.23	9.00	1.50	17.5	3.20	5.00	1.08	
Particle Size Analysis- Pipette													
Sand 2000 - 50 um	%	7	15.0	2.25	83.7	1.20	65.0	2.00	35.0	2.50	91.8	3.23	
Silt 50 - 2 um	%	7	62.0	2.00	7.48	1.16	26.0	4.00	47.5	2.62	2.00	0.400	
Clay 2 - 0 um	%	7	25.0	2.17	8.01	1.83	9.80	0.800	18.0	1.09	3.76	1.26	
Solvita CO2													
Solvita CO2	ppm	9	213	79.0	134	21.0	82.0	15.0	139	44.9	17.5	3.50	

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