



2021 North American Proficiency Testing Program  
Quarter 1 Soil Report - Wednesday, April 14, 2021

Laboratory ID  
# 352129

Soil	Soil 2021-101					Soil 2021-102			Soil 2021-103			Soil 2021-104			Soil 2021-105			
Analysis	Units	n	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	%	23	61.7	2.78	58.8	54.5	2.70	47.9	48.6	3.25	43.3	49.8	3.70	46	45.0	2.64	38.4	
pH - sp	Unit	33	7.40	0.060	7.3	7.04	0.070	6.9	6.10	0.130	5.9	6.00	0.200	6	6.43	0.100	6.4	
ECe - sp	dS/m	32	2.69	0.310	3.1	1.52	0.140	1.9	* H 0.865	0.180	1.2	1.52	0.210	1.8	0.458	0.044	0.5	
HCO3 - sp	mmolc/L	18	5.29	0.83	5.82	4.86	1.00	5.64	1.53	0.293	2.09	2.79	0.48	4.31	* H 2.53	0.469	2.79	
Ca - sp	mmolc/L	27	15.1	1.32	18.1	7.15	0.576	8.78	* H 5.44	1.15	7.99	11.5	2.02	15	3.14	0.520	3.48	
Mg - sp	mmolc/L	27	9.96	0.900	12.5	* H 4.83	0.370	6.51	** H 2.48	0.282	3.75	** H 2.40	0.238	2.92	1.01	0.170	1.1	
Na - sp	mmolc/L	27	1.27	0.120	1.55	0.220	0.032	0.25	0.250	0.040	0.29	0.817	0.077	0.83	0.220	0.026	0.25	
SAR - sp	value	23	0.366	0.036	0.4	0.100	0.010	0.09	0.127	0.027	0.012	** L 0.300	0.020	0.28	0.160	0.020	0.16	
Cl - sp	mmolc/L	21	2.17	0.250	2.61	3.81	0.429	4.98	* H 0.230	0.045	0.196	0.830	0.095	0.877	0.480	0.100	0.505	
SO4 - sp	mmolc/L	22	2.42	0.255	2.46	1.68	0.170	1.52	1.11	0.085	1.14	0.905	0.170	0.9	0.765	0.095	0.717	
NO3 - sp	mmolc/L	14	16.8	1.66	21.3	* H 2.55	0.56	4.58	* H 4.78	1.00	8.51	* H 9.28	1.40	10.1	0.060	0.013	0.012	* L
B - sp	mg/L	16	0.385	0.045	0.332	0.500	0.033	0.467	0.220	0.028	0.22	0.025	0.005		0.060	0.007		
<b>Soil pH &amp; EC</b>																		
Soil EC (1:1)	(dS/m)	38	1.20	0.120	1.9	** H 0.578	0.066	0.94	** H 0.465	0.045	0.54	0.439	0.060	0.72	** H 0.194	0.026	0.22	
Soil EC (1:2)	(dS/m)	43	0.890	0.067	1	0.457	0.063	0.52	0.310	0.020	0.29	0.330	0.050	0.37	0.130	0.020	0.13	
pH (1:1) Water	Unit	85	7.50	0.050	7.1	** L 7.10	0.050	6.5	** L 6.14	0.060	5.6	** L 5.62	0.090	5.4	6.50	0.070	6	** L
pH (1:2) Water	Unit	26	7.60	0.060	7.5	7.20	0.065	7.1	6.21	0.105	6.1	5.72	0.184	5.7	6.57	0.075	6.5	
pH (1:1) 0.01M CaCl2	Unit	23	7.35	0.060		6.85	0.030		5.81	0.040		5.40	0.050		6.03	0.030		
pH (1:2) 0.01M CaCl2	Unit	14	7.32	0.070		6.80	0.035		5.81	0.035		5.52	0.145		5.99	0.020		
<b>Buffer pH, Lime Req.</b>																		
SMP Buffer pH	Unit	27	7.37	0.050	7.2	* L 7.21	0.050	7.3	6.90	0.050	7	6.37	0.072	6.6	* H 7.08	0.055	7.2	
Adams-Evans Buf pH	Unit	8	7.68	0.100		7.80	0.095		7.58	0.055		7.17	0.080		7.68	0.075		
Woodruff Buf. pH	Unit	19	7.16	0.040		6.99	0.020		6.73	0.040		6.36	0.130		6.85	0.040		
Mehlich Buffer pH	Unit	7	6.74	0.070		6.61	0.020		6.20	0.040		5.98	0.045		6.38	0.020		
Sikora Buffer pH	Unit	30	7.37	0.035		7.30	0.035		6.91	0.060		6.44	0.056		7.13	0.060		
Titratable Acidity	cmol/kg																	
<b>Inorganic Nitrogen (NO3-N &amp; NH4-N)</b>																		
NO3-N Cd. Rd.	mg/kg	71	157	12.5		38.9	3.04		48.7	2.71		68.1	4.00		7.40	0.520		
NO3-N ISE	mg/kg	5	152	12.4		39.5	1.51		50.0	0.680		66.9	3.92		10.0	2.80		
NO3-N CTA	mg/kg	1	194	0.000		41.0	0.000		48.9	0.000		69.4	0.000		9.80	0.000		
NO3-N Ion Chr.	mg/kg	1	210	0.000		96.0	0.000		127	0.000		79.3	0.000		16.8	0.000		
NO3-N Other	mg/kg	11	166	15.6	166	40.2	3.27	37	48.2	1.66	48	67.9	4.11	68	8.57	0.735	8.35	
NH4 - N (KCl Extr.)	mg/kg	55	47.2	4.55	61	* H 105	10.0	134	* H 7.54	0.840	11	** H 12.9	1.29	18	* H 26.5	2.36	32	
<b>Phosphorus and Sulfur</b>																		
PO4-P Bray P (1:10)	mg/kg	47	44.0	3.00		122	8.20		36.0	2.00		39.0	3.00		19.1	1.57		
PO4-P Bray P1 (1:7)	mg/kg	6	36.3	2.80		99.6	3.10		33.2	5.80		24.9	3.11		17.6	2.31		
PO4-P Olsen/Bicarb	mg/kg	62	38.0	3.76	45	51.9	4.90	61	24.2	2.10	32	* H 20.0	2.30	20	12.7	1.70	19	* H
PO4-P AB-DTPA	mg/kg	2	21.0	2.26		32.1	5.52		14.0	2.92		16.5	8.57		9.37	2.51		
PO4-P Modified Morgan	mg/kg	4	39.0	4.95		18.6	2.40		12.6	0.500		1.90	0.600		3.65	0.300		
PO4-P True Morgan	mg/kg	8	39.4	0.750		19.6	1.12		13.6	1.07		2.20	0.330		4.30	0.452		
PO4-P Mod. Kewlona	mg/kg	2	47.8	8.25		91.6	8.35		27.4	4.65		16.5	0.500		12.0	1.95		
PO4-P Stong Bray (1:10)	mg/kg	10	138	3.00		212	9.05		89.0	8.66		57.8	2.70		43.1	3.00		
PO4-P Water Soluble	mg/kg																	
SO4 - S (PO4 Extr.)	mg/kg	29	23.1	4.83		14.0	1.80		8.12	1.15		12.1	1.78		6.25	1.36		

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Bases																	
K Ammonium Acetate	mg/kg	78	1,210	100	1250	266	19.5	285	254	14.0	233	64.8	5.75	70	162	8.00	144
Ca Ammonium Acetate	mg/kg	73	4,960	470	5420	1,330	98.2	1320	2,530	146	2220	1,930	171	1850	1,470	78.0	1240 * L
Mg Ammonium Acetate	mg/kg	73	1,080	74.0	1150	300	16.7	300	416	21.3	361	* L 149	10.8	131	175	9.18	146 * L
Na Ammonium Acetate	mg/kg	62	47.7	5.97	59	09.6	1.48	18	** H 15.1	3.12	20	26.2	3.42	27	11.0	1.53	11
Bray Extractable K	mg/kg	7	736	30.7		212	11.0		183	2.00		43.3	3.30		123	2.80	
K- Olsen/Bicarb.	mg/kg	4	1,020	62.0		263	3.00		218	4.50		53.3	0.920		152	4.00	
K Modified Morgan	mg/kg	3	1,210	4.00		270	6.00		236	8.00		61.5	3.50		156	5.50	
K True Morgan	mg/kg	6	736	37.5		223	10.8		163	14.0		40.9	2.84		122	10.3	
Ca Modified Morgan	mg/kg	3	7,160	606		1,720	21.0		2,590	135		2,530	45.0		1,620	171	
Aluminum KCL Extr.	mg/kg	4	0.726	0.294		0.750	0.322		0.915	0.085		1.00	0.500	1.5	0.658	0.350	

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	54.6	1.36		82.5	7.36		66.9	3.46		12.6	1.93		24.6	1.94	
K	mg/kg	8	579	37.7		215	10.7		154	11.5		33.4	1.48		114	4.32	
Ca	mg/kg	8	4,740	721		1,710	63.6		2,530	100		2,290	41.8		1,370	45.1	
Mg	mg/kg	8	915	38.4		337	27.2		376	22.5		136	4.22		156	1.47	
Mn	mg/kg	7	43.3	6.66		416	35.6		111	5.49		64.6	2.99		121	5.56	
Zn	mg/kg	7	0.730	0.130		4.83	0.130		3.09	0.220		1.13	0.030		1.41	0.040	

Mehlich-3 Multi-Element (scoop)																	
Scoop Soil Mass	g	25	1.84	0.070		1.83	0.090		2.03	0.055		1.85	0.120		1.98	0.130	
Assumed Density	g/cm3	19	0.920	0.045		0.915	0.045		1.03	0.040		0.930	0.070		0.990	0.060	
Volume of Scoop	cm3	24	2.00	0.000		2.00	0.000		2.00	0.000		2.00	0.000		2.00	0.000	
Extractant Volume mL	mL	16	20.0	0.000		20.0	0.000		20.0	0.000		20.0	0.000		20.0	0.000	
P Colorimetric	mg/kg	12	65.4	3.60		153	4.20		42.3	2.70		32.3	1.85		20.8	1.30	
P ICP-AES	mg/kg	53	72.5	3.00		164	9.30		48.1	2.46		43.6	5.17		26.0	1.50	
K	mg/kg	51	1,150	60.5		263	12.5		249	8.68		62.0	4.00		162	6.30	
Ca	mg/kg	50	5,500	290		1,570	87.3		2,800	127		2,290	161		1,580	76.4	
Mg	mg/kg	50	1,200	67.5		332	18.6		444	14.6		158	8.10		189	10.1	
Na	mg/kg	41	47.0	1.90		12.0	1.71		16.6	2.00		26.2	1.90		12.0	1.98	
S	mg/kg	46	36.9	2.30		24.6	1.40		14.5	0.921		21.9	1.16		11.3	1.20	
Al	mg/kg	33	532	33.0		833	42.7		392	18.9		1,230	81.0		500	30.8	
Zn	mg/kg	46	3.30	0.200		4.34	0.320		4.08	0.255		1.52	0.180		1.71	0.170	
Mn	mg/kg	46	103	5.85		358	27.7		253	11.5		67.7	2.91		205	12.0	
Fe	mg/kg	46	182	14.1		362	28.5		135	11.4		222	14.7		236	13.3	
Cu	mg/kg	46	4.74	0.340		1.63	0.183		1.58	0.090		1.10	0.105		1.69	0.160	
B	mg/kg	38	4.93	0.315		1.86	0.153		1.14	0.090		0.260	0.031		0.480	0.080	

Micronutrients																	
Zn - DTPA	mg/kg	68	1.31	0.110	1.3	2.23	0.195	2.3	2.58	0.196	2.5	0.800	0.100	0.917	0.940	0.080	0.934
Mn - DTPA	mg/kg	55	29.1	3.57	26.3	175	18.0	197	99.6	12.3	104	58.9	5.10	58.9	88.9	7.76	87.1
Fe - DTPA	mg/kg	58	53.0	6.05	50	127	13.9	123	49.4	6.02	46	99.8	14.6	100	63.2	9.00	66
Cu - DTPA	mg/kg	60	2.32	0.225	2.3	1.60	0.198	1.6	0.920	0.090	0.91	0.642	0.058	0.715	1.28	0.100	1.3
Zn - HCl	mg/kg	4	3.68	0.240		5.36	0.935		4.29	0.130		1.40	0.315		1.60	0.275	
Mn-H3PO4	mg/kg	12	24.0	2.76		377	23.6		79.6	5.87		55.6	5.44		90.1	6.62	
Cl - Ca(NO3)2 Extr.	mg/kg	16	39.2	4.42		63.4	6.10		3.42	0.32		11.0	0.985		6.05	1.00	
B - Hot Wat.	mg/kg	31	2.56	0.439	0.768	** L 1.34	0.150	0.659	** L 0.780	0.111	0.31	** L 0.185	0.028		0.295	0.044	
B-DTPA/Sorbitol	mg/kg	23	2.42	0.220		1.14	0.067		0.510	0.045		0.185	0.024		0.210	0.025	

Soil Organic Matter																	
Soil Kjeldahl N	%	14	0.354	0.006	0.39	** H 0.189	0.010	0.202	0.200	0.010	0.248	** H 0.202	0.008	0.214	0.130	0.009	0.123
Soil TN (combustion)	%	35	0.370	0.015		0.190	0.009		0.204	0.008		0.209	0.010		0.130	0.010	
Soil TOC (Combustion)	%	17	3.93	0.078	8	** H 2.00	0.057	2.26	** H 2.27	0.070	2.47	* H 2.33	0.052	2.57	** H 1.34	0.048	1.42
Soil Total C (Combustion)	%	30	4.10	0.125	8.11	** H 2.10	0.060	2.56	** H 2.28	0.112	2.73	** H 2.31	0.065	2.88	** H 1.31	0.048	2.96 ** H

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<b>SOM - Walkley-Black</b>	%	22	<b>6.49</b>	0.340	6.9		<b>3.48</b>	0.151	4.2	<b>** H</b>	<b>3.74</b>	0.250	4.1		<b>3.86</b>	0.215	4.4	<b>* H</b>	<b>2.23</b>	0.132	2.6	<b>* H</b>
<b>SOM - LOI (% Wt loss)</b>	%	72	<b>7.02</b>	0.300	8.6	<b>** H</b>	<b>4.05</b>	0.146	5.1	<b>** H</b>	<b>3.80</b>	0.150	4.5	<b>** H</b>	<b>4.82</b>	0.190	6	<b>** H</b>	<b>2.72</b>	0.115	3	
<b>Other</b>																						
<b>CaCO3 Content</b>	%	15	<b>2.47</b>	0.35	4.1	<b>** H</b>	<b>1.10</b>	0.195	1.3		<b>0.630</b>	0.093	0.8		<b>0.600</b>	0.093	0.7		<b>0.300</b>	0.036	0.5	<b>** H</b>
<b>CEC - Cation Displacement</b>	cmol/kg	15	<b>39.4</b>	3.50	40.8		<b>12.4</b>	1.50	13.9		<b>22.0</b>	3.17	22.5		<b>18.8</b>	2.28	24.9	<b>* H</b>	<b>12.1</b>	1.11	13.9	
<b>CEC - Estimation</b>	cmol/kg	11	<b>40.0</b>	1.50			<b>10.2</b>	0.700			<b>19.1</b>	0.900			<b>15.0</b>	1.13			<b>10.0</b>	0.300		
<b>Soil Density (Scoop)</b>	g/cc	12	<b>1.08</b>	0.040			<b>1.07</b>	0.022			<b>1.18</b>	0.026			<b>1.08</b>	0.031			<b>1.18</b>	0.030		
<b>Particle Size Analysis-Hydrometer</b>																						
<b>Sand 2000 - 50 um</b>	%	31	<b>41.0</b>	4.00	41		<b>22.0</b>	4.00	17		<b>59.0</b>	2.00	57		<b>24.0</b>	3.70	19		<b>22.0</b>	3.00	17	
<b>Silt 50 - 2 um</b>	%	31	<b>39.6</b>	4.60	51		<b>57.5</b>	3.50	73	<b>** H</b>	<b>21.3</b>	3.20	32	<b>* H</b>	<b>54.0</b>	5.10	69	<b>* H</b>	<b>61.2</b>	3.80	76	<b>* H</b>
<b>Clay 2 - 0 um</b>	%	31	<b>18.9</b>	3.10	8	<b>* L</b>	<b>20.0</b>	2.10	10	<b>** L</b>	<b>18.8</b>	2.20	11	<b>* L</b>	<b>22.4</b>	2.60	12	<b>* L</b>	<b>16.6</b>	2.60	7	<b>* L</b>
<b>Particle Size Analysis- Pipette</b>																						
<b>Sand 2000 - 50 um</b>	%	4	<b>44.0</b>	5.00			<b>25.5</b>	4.50			<b>61.0</b>	2.00			<b>29.5</b>	6.00			<b>21.0</b>	3.00		
<b>Silt 50 - 2 um</b>	%	4	<b>37.0</b>	0.000			<b>58.0</b>	1.50			<b>22.5</b>	0.500			<b>53.5</b>	1.50			<b>63.5</b>	2.50		
<b>Clay 2 - 0 um</b>	%	4	<b>17.0</b>	5.00			<b>18.5</b>	2.50			<b>18.5</b>	0.500			<b>19.5</b>	3.50			<b>15.5</b>	1.00		
<b>Solvita CO2</b>																						
	ppm	6	<b>125</b>	23.8			<b>135</b>	34.2			<b>107</b>	13.8			<b>200</b>	55.2			<b>130</b>	44.0		

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