



**2016 North American Proficiency Testing Program  
3rd Quarter Report - October 11, 2016**

**Laboratory ID  
General**

Soil Analysis	Units	n	Soil 2016-111			Soil 2016-112			Soil 2016-113			Soil 2016-114			Soil 2016-115		
			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	55.4	3.57		52.0	3.00		43.1	2.59		49.2	2.60		87.0	5.10	
pH - sp	Unit	30	7.40	0.079		5.98	0.085		7.03	0.063		7.20	0.035		4.90	0.060	
ECe - sp	dS/m	30	0.935	0.130		0.280	0.035		1.07	0.139		0.385	0.050		0.920	0.086	
HCO <sub>3</sub> - sp	mmolc/L	15	5.19	0.975		1.34	0.170		3.74	0.338		3.08	0.590		0.247	0.039	
Ca - sp	mmolc/L	27	7.88	1.03		1.53	0.170		5.48	0.670		2.46	0.300		4.88	0.310	
Mg - sp	mmolc/L	27	0.990	0.130		0.940	0.130		2.22	0.390		1.04	0.120		1.41	0.110	
Na - sp	mmolc/L	27	0.340	0.050		0.130	0.017		0.150	0.026		0.170	0.040		0.400	0.082	
SAR - sp	value	26	0.140	0.010		0.110	0.018		0.100	0.015		0.120	0.022		0.205	0.040	
Cl - sp	mmolc/L	18	0.610	0.063		0.200	0.026		0.200	0.028		0.130	0.030		0.107	0.014	
SO <sub>4</sub> - sp	mmolc/L	17	0.940	0.080		0.269	0.037		1.68	0.120		0.320	0.020		0.112	0.016	
NO <sub>3</sub> - sp	mmolc/L	10	1.30	0.266		0.155	0.019		2.64	0.592		0.067	0.015		6.545	1.05	
B - sp	mg/L	13	0.080	0.008		0.040	0.005		0.080	0.010		0.090	0.010		0.130	0.020	
<b>Soil pH &amp; EC</b>																	
Soil EC (1:1)	(dS/m)	40	0.649	0.060		0.130	0.030		0.574	0.064		0.285	0.035		0.370	0.063	
Soil EC (1:2)	(dS/m)	51	0.406	0.026		0.100	0.019		0.383	0.047		0.160	0.035		0.318	0.078	
pH (1:1) Water	Unit	93	7.62	0.091		5.99	0.060		7.21	0.070		7.43	0.080		4.90	0.060	
pH (1:2) Water	Unit	32	7.70	0.105		6.10	0.066		7.28	0.125		7.51	0.107		4.99	0.080	
pH (1:1) 0.01M CaCl <sub>2</sub>	Unit	24	7.31	0.060		5.43	0.040		6.87	0.065		6.96	0.050		4.62	0.040	
pH (1:2) 0.01M CaCl <sub>2</sub>	Unit	11	7.23	0.070		5.44	0.120		6.81	0.030		6.90	0.040		4.62	0.050	
<b>Buffer pH, Lime Req.</b>																	
SMP Buffer pH	Unit	27	7.38	0.030		6.48	0.076		7.13	0.050		7.25	0.080		5.73	0.200	
Adams-Evans Buf pH	Unit	9	7.82	0.030		7.34	0.050		7.70	0.070		7.70	0.030		6.88	0.130	
Woodruff Buf. pH	Unit	24	7.13	0.050		6.48	0.045		6.97	0.025		7.02	0.030		5.86	0.120	
Mehlich Buffer pH	Unit	7	6.82	0.090		6.07	0.040		6.64	0.070		6.65	0.100		5.52	0.140	
Sikora Buffer pH	Unit	27	7.43	0.040		6.53	0.085		7.18	0.040		7.25	0.030		5.85	0.125	
Titrateable Acidity	cmol/kg																

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

NO3-N Cd. Rd.	mg/kg	66	38.0	3.19	8.62	0.615	43.9	1.800	10.6	0.600	95.0	15.9
NO3-N ISE	mg/kg	13	39.0	7.00	9.00	2.00	46.0	4.00	11.1	1.13	73.0	16.0
NO3-N CTA	mg/kg	3	36.6	5.83	9.48	0.475	47.3	5.700	11.0	0.588	78.8	10.8
NO3-N Ion Chr.	mg/kg	2	19.1	19.1	3.73	3.61	21.6	18.482	4.45	4.44	53.6	46.4
NO3-N Other _____	mg/kg	8	37.6	3.80	8.48	0.625	43.6	3.565	9.76	1.15	96.7	4.76
NH4 - N (KCl Extr.)	mg/kg	56	12.0	1.38	37.3	3.26	172	8.490	3.68	0.57	4.91	1.05

### Phosphorus and Sulfur

PO4-P Bray P (1:10)	mg/kg	51	20.0	4.30	53.0	9.00	147	7.76	84.8	4.67	44.0	9.00
PO4-P Bray P1 (1:7)	mg/kg	6	14.5	5.80	29.5	5.80	104	6.66	65.4	5.75	18.2	3.45
PO4-P Olsen/Bicarb	mg/kg	55	35.2	4.50	18.0	2.00	89.3	5.70	49.0	3.70	34.5	4.80
PO4-P AB-DTPA	mg/kg	2	19.3	0.892	15.2	1.27	53.0	3.34	23.3	2.43	26.9	0.429
PO4-P Modified Morgan	mg/kg	9	28.9	7.00	2.00	0.273	30.2	3.30	41.1	5.75	2.58	0.325
PO4-P True Morgan	mg/kg	7	19.3	2.20	1.50	0.140	34.0	0.600	44.0	1.60	2.50	0.300
PO4-P Mod. Kewlona	mg/kg	3	62.0	5.00	23.0	0.900	110	6.00	74.0	0.000	14.0	3.30
PO4-P Stong Bray (1:10)	mg/kg	9	444	49.0	109	13.5	244	8.77	307	18.0	112	16.7
PO4-P Water Soluble	mg/kg	1	23.2	0.000	0.300	0.000	22.1	0.000	22.9	0.000	0.600	0.000
SO4 - S (PO4 Extr.)	mg/kg	32	9.76	1.77	7.00	1.30	12.7	2.05	3.23	0.478	15.9	3.71

### Bases

K Ammonium Acetate	mg/kg	80	385	40.2	74.0	7.91	642	39.0	531	29.5	282	65.0
Ca Ammonium Acetate	mg/kg	77	6100	838	801	71.2	2980	217	4160	291	823	167
Mg Ammonium Acetate	mg/kg	77	200	19.0	136	8.87	421	25.0	606	36.2	77.0	16.5
Na Ammonium Acetate	mg/kg	63	18.0	2.24	10.1	1.29	10.2	1.40	13.0	1.37	17.1	1.77
Bray Extractable K	mg/kg	6	247	8.13	53.3	1.80	441	34.9	325	8.51	179	7.55
K- Olsen/Bicarb.	mg/kg	6	368	17.0	65.2	2.45	515	20.0	354	5.50	324	14.5
K Modified Morgan	mg/kg	6	330	52.2	67.5	5.50	598	57.0	485	53.5	357	17.5
K True Morgan	mg/kg	6	291	20.5	62.4	7.25	404	17.0	260	12.0	285	11.0
Ca Modified Morgan	mg/kg	4	34800	8700	859	76.5	3190	130	4390	23.5	1020	52.5
Aluminum KCL Extr.	mg/kg	5	0.900	0.190	3.56	0.557	1.00	0.400	0.930	0.072	47.2	3.90

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Mehlich-1 Multi Element (scoop)													
Scoop Soil Mass	g	4	5.00	0.000	5.00	0.000	5.00	0.000	5.00	0.000	5.00	0.000	5.00
P	mg/kg	9	73.8	5.55	19.4	2.06	73.2	7.59	184	20.0	15.0	1.96	
K	mg/kg	9	167	8.64	44.9	2.09	366	10.0	249	19.4	183	9.92	
Ca	mg/kg	9	6420	1160	885	49.4	2940	116	3930	389	842	62.5	
Mg	mg/kg	9	149	9.37	135	10.8	393	15.6	562	33.4	58.3	5.55	
Mn	mg/kg	8	3.35	0.325	43.2	1.25	270	15.2	32.7	4.19	9.41	0.739	
Zn	mg/kg	8	0.205	0.043	2.35	0.160	3.03	0.200	1.67	0.305	2.32	0.236	
Mehlich-3 Multi-Element (scoop)													
Scoop Soil Mass	g	25	1.75	0.120	1.92	0.080	2.03	0.053	2.05	0.060	1.26	0.090	
Assumed Density	g/cm3	14	0.905	0.070	0.981	0.075	1.08	0.078	1.08	0.070	0.623	0.060	
Volume of Scoop	cm3	23	2.00	0.000	2.00	0.000	2.00	0.000	2.00	0.000	2.00	0.000	
Extractant Volume mL	mL	23	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	124	7.00	41.0	3.50	183	3.00	100	6.82	35.8	2.35	
P ICP-AES	mg/kg	53	126	9.35	42.0	4.92	200	12.0	108	4.70	38.7	7.90	
K	mg/kg	56	375	28.5	66.9	5.34	672	40.7	550	29.2	248	28.4	
Ca	mg/kg	52	10200	836	852	71.0	3350	137	4620	213	806	141	
Mg	mg/kg	53	226	14.8	142	7.18	457	22.8	699	28.3	65.2	12.6	
Na	mg/kg	40	20.3	2.11	11.2	1.73	9.60	1.43	12.1	1.32	18.0	2.12	
S	mg/kg	46	17.0	2.00	16.2	1.86	21.5	1.65	8.40	1.60	22.6	2.93	
Al	mg/kg	33	121	23.0	1690	125	761	47.0	576	45.9	1850	161	
Zn	mg/kg	48	7.16	0.650	2.52	0.245	3.72	0.415	3.83	0.405	2.26	0.340	
Mn	mg/kg	49	40.3	4.70	41.3	2.34	313	22.2	211	20.3	6.43	0.990	
Fe	mg/kg	47	34.0	2.47	130	14.5	409	46.0	115	9.65	71.2	6.84	
Cu	mg/kg	49	7.44	0.640	0.865	0.141	2.92	0.280	3.63	0.330	0.730	0.145	
B	mg/kg	39	1.50	0.150	0.400	0.077	1.01	0.200	1.55	0.230	0.505	0.110	

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Micronutrients													
Zn - DTPA	mg/kg	69	2.89	0.290	1.56	0.130	1.71	0.110	1.70	0.100	1.44	0.330	
Mn - DTPA	mg/kg	54	14.0	1.60	31.1	2.55	220	16.1	20.5	2.70	5.20	1.21	
Fe - DTPA	mg/kg	57	9.20	0.960	87.0	9.30	126	18.2	20.8	1.50	46.0	7.60	
Cu - DTPA	mg/kg	58	3.72	0.420	0.600	0.075	2.09	0.140	1.00	0.095	0.400	0.085	
Zn - HCl	mg/kg	4	0.855	0.250	2.69	0.095	4.13	0.065	3.87	0.115	3.18	0.195	
Mn-H3PO4	mg/kg	10	4.32	0.870	33.5	5.70	237	21.5	19.5	4.81	6.48	1.44	
Cl - Ca(NO3)2 Extr.	mg/kg	17	10.0	1.30	2.80	0.399	3.83	0.630	2.71	0.432	2.30	0.276	
B - Hot Wat.	mg/kg	34	0.589	0.125	0.280	0.061	0.570	0.123	0.835	0.119	0.725	0.116	
B-DTPA/Sorbitol	mg/kg	17	0.830	0.080	0.250	0.050	0.520	0.020	0.800	0.030	0.290	0.040	
Soil Organic Matter													
Soil Kjeldahl N	%	20	0.216	0.021	0.259	0.015	0.238	0.010	0.241	0.017	0.521	0.036	
Soil TN (combustion)	%	43	0.298	0.018	0.274	0.016	0.242	0.013	0.241	0.019	0.540	0.030	
Soil TOC (Combustion)	%	10	2.73	0.353	3.09	0.080	2.43	0.065	2.97	0.089	5.85	0.297	
Soil Total C (Combustion)	%	36	4.63	0.170	3.15	0.064	2.47	0.065	3.04	0.065	5.91	0.145	
SOM - Walkley-Black	%	28	4.00	0.270	5.37	0.376	4.15	0.150	5.00	0.273	9.77	1.44	
SOM - LOI (% Wt loss)	%	75	4.40	0.200	6.42	0.220	4.60	0.200	5.10	0.230	12.2	0.660	
Other													
CaCO3 Content	%	13	17.2	2.90	0.450	0.068	0.685	0.121	1.30	0.250	0.410	0.069	
CEC - Cation Displacement	cmol/kg	21	27.3	3.55	15.0	3.40	24.0	3.98	31.1	5.19	28.0	5.02	
CEC - Estimation	cmol/kg	11	33.2	5.20	12.3	1.43	21.0	1.63	29.3	1.74	19.0	4.05	
Soil Density (Scoop)	g/cc	8	0.980	0.040	1.07	0.025	1.17	0.031	1.17	0.045	0.710	0.046	
Particle Size Analysis-Hydrometer													
Sand 2000 - 50 um	%	39	16.0	3.87	46.0	4.00	31.1	3.90	29.4	4.15	27.5	4.50	
Silt 50 - 2 um	%	39	30.3	3.84	42.4	3.57	44.0	4.50	44.0	3.00	63.7	3.80	
Clay 2 - 0 um	%	39	52.5	2.50	12.0	3.00	25.0	3.00	28.7	3.18	9.06	1.34	
Particle Size Analysis- Pipette													
Sand 2000 - 50 um	%	7	13.0	2.80	42.7	0.700	25.7	1.11	22.8	1.86	19.2	5.97	
Silt 50 - 2 um	%	7	32.8	1.80	47.6	3.40	48.7	2.16	45.4	2.85	70.2	5.71	
Clay 2 - 0 um	%	7	54.1	1.89	12.3	2.00	26.7	1.10	28.4	1.78	11.1	2.51	
Solvita CO2													
Solvita CO2	ppm	5	134	6.90	148	11.0	195	17.0	141	35.0	107	3.25	

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