



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

Laboratory ID

303255

Soil Analysis	Units	n	Soil 2016-111			Soil 2016-112			Soil 2016-113			Soil 2016-114			Soil 2016-115							
			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	%	23	55.4	3.57	58.932	52.0	3.00	55.674	43.1	2.59	43.935	49.2	2.60	48.27	87.0	5.10	93.769					
pH - sp	Unit	30	7.40	0.079	7.39	5.98	0.085	5.99	7.03	0.063	7.08	7.20	0.035	7.19	4.90	0.060	4.91					
ECe - sp	dS/m	30	0.935	0.130	0.9822	0.280	0.035	0.2688	1.07	0.139	1.164	0.385	0.050	0.2891	0.920	0.086	0.8841					
HCO ₃ - sp	mmolc/L	15	5.19	0.975	4.2151	1.34	0.170	1.1757	3.74	0.338	3.4792	3.08	0.590	2.6794	0.247	0.039	0.2639					
Ca - sp	mmolc/L	27	7.88	1.03	6.8522	1.53	0.170	1.2204	5.48	0.670	4.9178	2.46	0.300	1.7845	4.88	0.310	4.2521					
Mg - sp	mmolc/L	27	0.990	0.130	0.946	0.940	0.130	0.7771	2.22	0.390	2.002	1.04	0.120	0.8026	1.41	0.110	1.354					
Na - sp	mmolc/L	27	0.340	0.050	0.3604	0.130	0.017	0.1069	0.150	0.026	0.2245	* H	0.170	0.040	0.1447	0.400	0.082	0.3133				
SAR - sp	value	26	0.140	0.010	0.18	* H	0.110	0.018	0.11	0.100	0.015	0.12	0.120	0.022	0.12	0.205	0.040	0.19				
Cl - sp	mmolc/L	18	0.610	0.063	0.3557	** L	0.200	0.026	0.0603	** L	0.200	0.028	0.1097	* L	0.130	0.030	0.0579	0.107	0.014	0.0319	** L	
SO ₄ - sp	mmolc/L	17	0.940	0.080	0.6704	* L	0.269	0.037	0.0713	** L	1.68	0.120	1.317	* L	0.320	0.020	0.2057	** L	0.112	0.016	0.0466	** L
NO ₃ - sp	mmolc/L	10	1.30	0.266	0.1237	** L	0.155	0.019	0.113	2.64	0.592	0.6184	* L	0.067	0.015	0.0698	6.545	1.05	0.5864	** L		
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						
Soil pH & EC																						
Soil EC (1:1)	(dS/m)	40	0.649	0.060	0.483	* L	0.130	0.030	0.1775	0.574	0.064	0.548	0.285	0.035	0.2004	0.370	0.063	0.6282	** H			
Soil EC (1:2)	(dS/m)	51	0.406	0.026	0.1914	** L	0.100	0.019	0.1249	0.383	0.047	0.434	0.160	0.035	0.1664	0.318	0.078	0.4622				
pH (1:1) Water	Unit	93	7.62	0.091	7.92	* H	5.99	0.060	6.4	** H	7.21	0.070	7.69	** H	7.43	0.080	7.76	** H	4.90	0.060	5.67	** H
pH (1:2) Water	Unit	32	7.70	0.105	7.92		6.10	0.066	6.25		7.28	0.125	7.57		7.51	0.107	7.66		4.99	0.080	5.39	** H
pH (1:1) 0.01M CaCl ₂	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 ₂	Unit	11	7.23	0.070		5.44	0.120		6.81	0.030		6.90	0.040		4.62	0.050						
Buffer pH, Lime Req.																						
SMP Buffer pH	Unit	27	7.38	0.030	7.4	6.48	0.076	6.34	7.13	0.050	7.1	7.25	0.080	7.25	5.73	0.200	5.29					
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	37.055	8.62	0.615	8.31	43.9	1.800	46.725	10.6	0.600	9.875	95.0	15.9	127.6
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	0.0209	3.73	3.61	0.1104	21.6	18.482	3.1362	4.45	4.44	0.0173	53.6	46.4	7.1351
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	8.31	* L 37.3	3.26	36.975	172	8.490	68.48	** L 3.68	0.57	3.1675	4.91	1.05	4.5335

Phosphorus and Sulfur

PO4-P Bray P (1:10)	mg/kg	51	20.0	4.30	8.591	* L 53.0	9.00	35.963	147	7.76	154.08	84.8	4.67	96.121	44.0	9.00	17.252	* L
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	39.594	18.0	2.00	12.044	* L 89.3	5.70	70.008	* L 49.0	3.70	39.757	34.5	4.80	15.181	** L
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	1.0727	** L 74.0	7.91	0.2019	** L 642	39.0	1.717	** L 531	29.5	1.386	** L 282	65.0	0.957	** L
Ca Ammonium Acetate	mg/kg	77	6100	838	31.882	** L 801	71.2	4.0134	** L 2980	217	15.414	** L 4160	291	21.524	** L 823	167	4.8835	** L
Mg Ammonium Acetate	mg/kg	77	200	19.0	1.665	** L 136	8.87	1.084	** L 421	25.0	3.282	** L 606	36.2	4.839	** L 77.0	16.5	0.6839	** L
Na Ammonium Acetate	mg/kg	63	18.0	2.24	0.0827	** L 10.1	1.29	0.0468	** L 10.2	1.40	0.048	** L 13.0	1.37	0.0561	** L 17.1	1.77	0.0931	** L
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	3.1064	1.56	0.130	1.4646	1.71	0.110	1.615	1.70	0.100	1.6817	1.44	0.330	1.5817			
Mn - DTPA	mg/kg	54	14.0	1.60	14.94	31.1	2.55	29.336	220	16.1	207.06	20.5	2.70	19.168	5.20	1.21	5.7876			
Fe - DTPA	mg/kg	57	9.20	0.960	8.9076	87.0	9.30	98.918	126	18.2	125.6	20.8	1.50	20.312	46.0	7.60	50.248			
Cu - DTPA	mg/kg	58	3.72	0.420	3.9462	0.600	0.075	0.546	2.09	0.140	2.0308	1.00	0.095	0.9953	0.400	0.085	0.417			
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	0.5723	0.280	0.061	0.0851	* L	0.570	0.123	0.1718	* L	0.835	0.119	0.3181	** L	0.725	0.116	0.4741
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	0.2217	0.259	0.015	0.2964	* H	0.238	0.010	0.2916	** H	0.241	0.017	0.2464	0.521	0.036	0.525	
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	3.2005	3.09	0.080	2.6928	** L	2.43	0.065	2.3001	2.97	0.089	2.955	5.85	0.297	5.2455		
Soil Total C (Combustion)	%	36	4.63	0.170	4.4128	3.15	0.064	3.1538	2.47	0.065	2.4746	3.04	0.065	3.0767	5.91	0.145	6.1252			
SOM - Walkley-Black	%	28	4.00	0.270	3.7791	5.37	0.376	5.1963	4.15	0.150	3.8421	5.00	0.273	4.8499	9.77	1.44	9.5108			
SOM - LOI (% Wt loss)	%	75	4.40	0.200	2.6535	** L	6.42	0.220	6.266	4.60	0.200	4.5753	5.10	0.230	5.289	12.2	0.660	12.148		
Other																				
CaCO3 Content	%	13	17.2	2.90	17.079	0.450	0.068	0.5	0.685	0.121	1.573	** H	1.30	0.250	2.543	** H	0.410	0.069	0.711	** H
CEC - Cation Displacement	cmol/kg	21	27.3	3.55	34.408	15.0	3.40	20.929	24.0	3.98	28.069	31.1	5.19	36.245	28.0	5.02	43.134	* H		
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	10	46.0	4.00	41	31.1	3.90	24	29.4	4.15	22	27.5	4.50	22			
Silt 50 - 2 um	%	39	30.3	3.84	35	42.4	3.57	44	44.0	4.50	45	44.0	3.00	45	63.7	3.80	67			
Clay 2 - 0 um	%	39	52.5	2.50	55	12.0	3.00	15	25.0	3.00	31	28.7	3.18	33	9.06	1.34	11			
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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