



**2016 North American Proficiency Testing Program
4th Quarter Report - January 13, 2017**

**Laboratory ID
General**

Soil Analysis	Units	n	Soil 2016-116			Soil 2016-117			Soil 2016-118			Soil 2016-119			Soil 2016-120		
			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	%	20	42.2	1.84		46.8	2.67		35.2	2.29		38.8	1.97		39.5	3.04	
pH - sp	Unit	27	7.03	0.110		5.88	0.230		5.50	0.100		7.60	0.100		6.70	0.110	
ECe - sp	dS/m	27	1.17	0.180		1.50	0.120		1.14	0.128		0.791	0.059		0.190	0.020	
HCO ₃ - sp	mmolc/L	11	3.20	0.440		2.82	0.538		0.803	0.072		3.88	0.525		1.01	0.190	
Ca - sp	mmolc/L	24	5.57	0.62		12.1	1.15		5.59	0.385		4.52	0.625		0.925	0.201	
Mg - sp	mmolc/L	24	2.23	0.260		2.32	0.245		2.54	0.250		2.86	0.300		0.580	0.095	
Na - sp	mmolc/L	25	0.139	0.012		0.700	0.090		0.800	0.100		1.05	0.070		0.220	0.050	
SAR - sp	value	21	0.100	0.013		0.300	0.050		0.400	0.010		0.530	0.030		0.220	0.020	
Cl - sp	mmolc/L	14	0.260	0.062		0.701	0.061		0.510	0.080		0.652	0.112		0.200	0.019	
SO ₄ - sp	mmolc/L	15	1.60	0.216		0.870	0.120		0.870	0.070		1.83	0.230		0.212	0.022	
NO ₃ - sp	mmolc/L	11	3.99	0.857		9.29	2.03		7.65	0.990		0.240	0.041		0.063	0.013	
B - sp	mg/L	13	0.090	0.012		0.029	0.005		0.059	0.006		0.338	0.012		0.100	0.007	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	41	0.551	0.049		0.445	0.056		0.369	0.059		0.370	0.040		0.080	0.013	
Soil EC (1:2)	(dS/m)	47	0.380	0.040		0.320	0.040		0.259	0.029		0.250	0.020		0.055	0.009	
pH (1:1) Water	Unit	91	7.20	0.070		5.66	0.080		5.60	0.060		7.80	0.080		6.86	0.090	
pH (1:2) Water	Unit	31	7.34	0.090		5.79	0.090		5.70	0.100		7.93	0.130		6.97	0.070	
pH (1:1) 0.01M CaCl ₂	Unit	26	6.88	0.035		5.35	0.090		5.22	0.055		7.41	0.045		6.10	0.060	
pH (1:2) 0.01M CaCl ₂	Unit	14	6.87	0.070		5.49	0.100		5.26	0.045		7.41	0.080		6.10	0.030	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	26	7.13	0.062		6.35	0.094		6.81	0.070		7.48	0.035		7.10	0.055	
Adams-Evans Buf pH	Unit	11	7.67	0.050		7.24	0.060		7.64	0.050		7.85	0.050		7.72	0.090	
Woodruff Buf. pH	Unit	24	6.97	0.030		6.42	0.065		6.67	0.045		7.10	0.040		6.84	0.040	
Mehlich Buffer pH	Unit	8	6.61	0.075		5.93	0.070		6.15	0.050		6.71	0.055		6.31	0.030	
Sikora Buffer pH	Unit	24	7.20	0.045		6.40	0.080		6.79	0.090		7.49	0.045		7.04	0.040	
Titrateable Acidity	cmol/kg																

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Inorganic Nitrogen (NO3-N & NH4-N)

NO3-N Cd. Rd.	mg/kg	60	43.9	1.91		66.0	4.98		49.3	2.32		13.8	1.25		1.00	0.101
NO3-N ISE	mg/kg	15	43.0	7.00		59.0	8.90		49.0	4.14		14.5	1.47		2.20	0.306
NO3-N CTA	mg/kg	1	43.9	0.00		59.6	0.000		46.2	0.000		14.4	0.000		1.78	0.000
NO3-N Ion Chr.	mg/kg	2	41.7	5.30		68.8	7.25		46.1	4.90		12.4	1.60		0.900	0.200
NO3-N Other _____	mg/kg	10	45.4	1.16		65.8	8.10		46.5	7.09		13.3	1.30		0.993	0.181
NH4 - N (KCl Extr.)	mg/kg	50	173	14.2		10.4	1.30		3.80	0.610		4.16	0.621		2.36	0.236

Phosphorus and Sulfur

PO4-P Bray P (1:10)	mg/kg	50	150	7.20		36.4	3.10		217	12.7		16.0	1.35		40.0	3.30
PO4-P Bray P1 (1:7)	mg/kg	5	111	8.00		22.2	2.20		167	18.3		12.9	0.50		32.8	0.500
PO4-P Olsen/Bicarb	mg/kg	52	87.5	5.63		21.0	2.75		63.0	4.40		10.0	1.00		21.0	1.70
PO4-P AB-DTPA	mg/kg	2	47.5	0.952		23.0	2.84		34.1	3.73		6.56	0.139		14.4	0.553
PO4-P Modified Morgan	mg/kg	9	30.1	1.40		2.06	0.241		12.7	0.730		6.30	0.500		5.43	0.370
PO4-P True Morgan	mg/kg	6	34.6	1.60		2.00	0.200		15.1	0.850		6.69	0.400		6.80	0.225
PO4-P Mod. Kewlona	mg/kg	3	110	7.00		20.0	2.000		139	9.00		15.0	0.000		33.0	1.00
PO4-P Stong Bray (1:10)	mg/kg	9	240	16.0		52.0	2.49		291	13.7		65.0	3.00		80.6	2.40
PO4-P Water Soluble	mg/kg															
SO4 - S (PO4 Extr.)	mg/kg	29	12.9	2.40		11.2	1.62		7.89	1.39		14.78	2.170		2.66	0.334

Bases

K Ammonium Acetate	mg/kg	76	643	31.7		65.3	5.30		206	12.5		246	20.5		530	29.4
Ca Ammonium Acetate	mg/kg	72	2970	162		1950	209		675	59.5		2570	226		1290	84.0
Mg Ammonium Acetate	mg/kg	72	425	23.0		151	9.50		110	7.94		508	32.5		301	17.0
Na Ammonium Acetate	mg/kg	56	10.1	1.26		25.7	2.69		18.4	2.40		33.0	3.45		15.0	2.70
Bray Extractable K	mg/kg	6	450	11.4		45.6	3.76		187	16.4		192	15.6		411	14.2
K- Olsen/Bicarb.	mg/kg	7	512	19.0		48.6	7.01		204	5.00		191	10.2		435	5.00
K Modified Morgan	mg/kg	6	615	17.5		60.5	11.5		196	17.0		223	1.00		520	13.5
K True Morgan	mg/kg	6	414	14.0		43.5	1.00		173	2.50		142	2.50		361	20.0
Ca Modified Morgan	mg/kg	4	3160	139		2520	145		614	22.5		3750	150		1300	28.0
Aluminum KCL Extr.	mg/kg	5	1.40	0.401		1.00	0.400		1.10	0.100		1.00	0.800		0.636	0.400

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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
P	mg/kg	8	66.5	7.13	11.3	0.595	115	1.60	32.0	1.67	39.0	3.59	
K	mg/kg	8	365	14.7	31.0	3.05	172	11.4	136	11.2	351	32.8	
Ca	mg/kg	8	3070	72.7	2380	55.5	791	49.0	3250	61.0	1390	42.2	
Mg	mg/kg	8	402	25.4	140	5.18	111	6.73	623	48.4	297	25.1	
Mn	mg/kg	7	281	21.9	43.3	1.71	49.7	2.30	42.5	1.99	19.6	0.871	
Zn	mg/kg	7	2.82	0.090	1.25	0.227	4.50	0.271	1.46	0.220	3.34	0.135	
Mehlich-3 Multi-Element (scoop)													
Scoop Soil Mass	g	26	2.05	0.086	1.90	0.100	2.16	0.140	2.26	0.081	2.10	0.095	
Assumed Density	g/cm3	15	1.09	0.090	0.976	0.056	1.14	0.040	1.18	0.045	1.06	0.058	
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	15	183	5.30	29.0	1.00	211	13.0	19.5	1.51	43.0	3.00	
P ICP-AES	mg/kg	51	199	11.0	38.5	5.53	234	15.3	22.0	2.00	46.7	2.90	
K	mg/kg	55	657	41.5	60.2	5.53	211	13.3	258	12.3	539	28.0	
Ca	mg/kg	50	3270	206	2340	203	766	89.5	3190	251	1420	98.0	
Mg	mg/kg	51	454	25.9	156	11.3	120	11.0	614	38.0	321	15.0	
Na	mg/kg	38	9.22	1.78	24.9	3.90	17.5	4.02	33.5	4.55	15.3	2.94	
S	mg/kg	43	21.0	1.74	20.4	2.30	17.0	2.01	26.7	2.10	5.05	1.04	
Al	mg/kg	30	730	51.0	1260	51.0	1020	51.3	377	30.5	744	54.0	
Zn	mg/kg	46	3.79	0.375	1.63	0.170	5.53	0.275	2.03	0.180	3.97	0.265	
Mn	mg/kg	47	313	17.3	55.3	3.30	104	11.0	131	8.44	34.9	3.77	
Fe	mg/kg	46	396	38.6	252	19.0	191	17.0	159	14.5	148	15.2	
Cu	mg/kg	46	2.89	0.300	1.21	0.160	3.80	0.300	1.80	0.140	1.90	0.160	
B	mg/kg	36	1.10	0.150	0.310	0.044	0.390	0.040	2.45	0.245	0.510	0.090	

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Micronutrients													
Zn - DTPA	mg/kg	63	1.73	0.130	0.930	0.070	2.70	0.206	1.10	0.100	2.27	0.200	
Mn - DTPA	mg/kg	50	215	18.3	35.0	2.55	30.1	1.98	12.1	2.01	7.76	1.03	
Fe - DTPA	mg/kg	53	122	12.4	118	12.7	42.0	7.32	35.7	4.74	29.3	4.12	
Cu - DTPA	mg/kg	53	2.06	0.150	0.640	0.050	2.22	0.180	0.870	0.066	0.800	0.070	
Zn - HCl	mg/kg	2	4.32	0.130	1.87	0.075	5.05	0.020	2.09	0.155	4.16	0.130	
Mn-H3PO4	mg/kg	9	243	16.0	35.1	4.27	43.2	1.35	29.4	2.59	11.4	0.720	
Cl - Ca(NO3)2 Extr.	mg/kg	19	3.90	0.375	11.0	1.71	6.60	0.750	9.90	1.51	3.12	0.388	
B - Hot Wat.	mg/kg	34	0.575	0.125	0.200	0.025	0.276	0.043	1.24	0.262	0.400	0.072	
B-DTPA/Sorbitol	mg/kg	16	0.470	0.050	0.210	0.045	0.165	0.016	1.43	0.070	0.235	0.025	
Soil Organic Matter													
Soil Kjeldahl N	%	14	0.240	0.009	0.199	0.006	0.098	0.005	0.088	0.005	0.082	0.003	
Soil TN (combustion)	%	41	0.245	0.015	0.210	0.010	0.101	0.011	0.089	0.011	0.090	0.013	
Soil TOC (Combustion)	%	8	2.47	0.083	2.30	0.066	1.06	0.059	0.908	0.023	1.08	0.030	
Soil Total C (Combustion)	%	31	2.46	0.073	2.30	0.040	1.07	0.040	1.07	0.042	1.07	0.040	
SOM - Walkley-Black	%	27	4.20	0.150	3.87	0.170	1.67	0.128	1.70	0.180	1.90	0.126	
SOM - LOI (% Wt loss)	%	73	4.57	0.180	4.87	0.220	2.40	0.120	1.80	0.100	2.58	0.170	
Other													
CaCO3 Content	%	11	0.700	0.138	0.400	0.069	0.345	0.061	1.40	0.180	0.630	0.133	
CEC - Cation Displacement	cmol/kg	18	22.3	5.03	20.1	3.90	7.90	1.62	13.0	1.90	13.4	2.43	
CEC - Estimation	cmol/kg	12	21.1	1.80	17.3	1.50	8.30	1.45	18.0	2.50	12.1	1.93	
Soil Density (Scoop)	g/cc	9	1.20	0.040	1.07	0.060	1.24	0.060	1.28	0.060	1.21	0.060	
Particle Size Analysis-Hydrometer													
Sand 2000 - 50 um	%	37	32.1	3.15	25.0	4.00	38.0	3.00	38.0	3.00	67.5	3.50	
Silt 50 - 2 um	%	37	44.0	3.00	52.1	3.10	47.4	2.40	42.0	3.20	23.8	2.20	
Clay 2 - 0 um	%	37	25.0	3.00	22.5	2.50	14.3	1.70	21.0	1.80	8.40	1.60	
Particle Size Analysis- Pipette													
Sand 2000 - 50 um	%	6	23.2	1.41	19.5	2.83	33.4	1.45	35.5	4.55	65.2	2.75	
Silt 50 - 2 um	%	6	43.2	6.80	57.4	7.30	52.8	2.65	38.0	2.31	27.1	2.25	
Clay 2 - 0 um	%	6	22.4	5.70	20.5	4.30	15.2	2.45	18.7	2.10	8.55	0.845	
Solvita CO2													
Solvita CO2	ppm	7	117	25.0	179	52.0	60.9	13.1	74.6	17.6	63.0	8.00	

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