



2009 North American Proficiency Testing Program  
3rd Quarter Report - September 20, 2009

Laboratory ID

Soil Analysis	Units	n	Soil 2009-111			Soil 2009-112			Soil 2009-113			Soil 2009-114			Soil 2009-115		
			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	%	25	22.5	1.00		38.0	2.00		35.9	1.64		60.5	3.45		35.6	1.42	
pH - sp	Unit	37	6.30	0.140		5.31	0.160		7.51	0.155		6.13	0.110		7.57	0.125	
ECe - sp	dS/m	37	0.500	0.060		0.420	0.050		0.860	0.110		0.343	0.070		1.31	0.155	
HCO <sub>3</sub> - sp	mmolc/L	13	0.800	0.225		0.900	0.348		4.39	1.56		2.64	0.965		6.72	1.19	
Ca - sp	mmolc/L	31	2.71	0.310		2.00	0.274		5.45	0.520		2.24	0.390		11.2	1.00	
Mg - sp	mmolc/L	31	1.19	0.180		1.14	0.130		2.93	0.240		0.990	0.180		3.39	0.350	
Na - sp	mmolc/L	31	0.630	0.152		0.480	0.120		0.480	0.120		0.400	0.180		0.698	0.144	
SAR - sp	value	27	0.469	0.130		0.368	0.115		0.230	0.060		0.220	0.110		0.240	0.060	
Cl - sp	mmolc/L	16	0.268	0.080		0.533	0.038		2.13	0.130		0.431	0.136		3.60	0.400	
SO <sub>4</sub> - sp	mmolc/L	15	0.830	0.090		0.361	0.031		1.22	0.165		0.420	0.040		4.15	0.490	
NO <sub>3</sub> - sp	mmolc/L	13	3.15	0.470		1.98	0.370		0.260	0.253		0.030	0.020		0.130	0.111	
B - sp	mg/L	15	0.060	0.020		0.070	0.020		0.070	0.020		0.060	0.010		0.220	0.040	
<b>Soil pH &amp; EC</b>																	
Soil EC (1:1)	(dS/m)	33	0.150	0.040		0.145	0.035		0.340	0.070		0.120	0.020		0.540	0.080	
Soil EC (1:2)	(dS/m)	45	0.080	0.013		0.100	0.020		0.210	0.027		0.090	0.011		0.364	0.047	
pH (1:1) Water	Unit	79	6.46	0.090		5.48	0.080		7.70	0.090		6.30	0.060		7.87	0.080	
pH (1:2) Water	Unit	27	6.60	0.135		5.60	0.110		7.79	0.160		6.37	0.125		7.95	0.099	
pH (1:1) 0.01M CaCl <sub>2</sub>	Unit	22	5.99	0.060		4.93	0.055		7.34	0.090		5.70	0.030		7.59	0.080	
pH (1:2) 0.01M CaCl <sub>2</sub>	Unit	7	5.94	0.060		4.90	0.020		7.30	0.100		5.61	0.090		7.60	0.030	
<b>Buffer pH, Lime Req.</b>																	
SMP Buffer pH	Unit	50	7.26	0.060		6.32	0.095		7.40	0.045		6.58	0.090		7.47	0.040	
Adams-Evans Buf pH	Unit	9	7.83	0.052		7.43	0.065		7.82	0.025		7.48	0.035		7.85	0.030	
Woodruff Buf. pH	Unit	24	6.91	0.030		6.28	0.090		7.10	0.030		6.50	0.050		7.18	0.050	
Mehlich Buffer pH	Unit	7	6.44	0.010		5.90	0.030		6.87	0.070		6.11	0.015		6.90	0.030	
Sikora Buffer pH	Unit	16	7.31	0.125		6.39	0.120		7.49	0.100		6.63	0.130		7.55	0.050	
Titrateable Acidity	cmol/kg	0															

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<b>Inorganic Nitrogen (NO3-N &amp; NH4-N)</b>																	
NO3-N Cd. Rd.	mg/kg	59	12.1	1.05		13.5	0.75		27.3	1.15		1.40	0.400		16.5	1.07	
NO3-N ISE	mg/kg	18	13.0	2.70		12.6	2.50		26.0	5.00		2.47	0.630		16.7	2.23	
NO3-N CTA	mg/kg	3	12.7	0.53		14.7	0.48		25.0	3.09		4.30	0.330		16.0	1.32	
NO3-N Ion Chr.	mg/kg	1	9.19			11.4						0.740			13.6		
NO3-N Other _____	mg/kg	13	11.2	2.13		13.4	0.93		26.3	2.58		4.00	3.000		15.0	1.32	
NH4 - N (KCl Extr.)	mg/kg	46	1.70	0.575		11.8	1.28		10.1	0.75		7.36	0.934		4.13	0.485	
<b>Phosphorus and Sulfur</b>																	
PO4-P Bray P (1:10)	mg/kg	52	15.0	1.90		213	16.8		23.4	2.35		68.0	4.60		23.7	4.69	
PO4-P Bray P1 (1:7)	mg/kg	7	12.4	1.17		161	18.0		14.0	1.00		57.4	6.01		14.7	2.98	
PO4-P Olsen/Bicarb	mg/kg	57	6.00	1.00		66.7	7.27		12.1	1.31		38.1	3.90		14.1	1.73	
PO4-P AB-DTPA	mg/kg	2	6.09	1.14		36.5	11.7		10.9	4.15		26.0	9.60		13.3	4.10	
PO4-P Modified Morgan	mg/kg	4	1.70	0.400		7.40	1.30		4.70	0.300		9.15	1.55		17.3	0.50	
PO4-P True Morgan	mg/kg	5	1.90	0.100		8.00	2.00		4.80	0.200		12.1	1.10		17.3	2.70	
PO4-P Mod. Kewlona	mg/kg	2	8.00	1.43		119	9.6		15.9	1.34		50.3	2.35		18.8	2.62	
PO4-P Stong Bray (1:10)	mg/kg	9	20.0	2.06		328	42.7		69.3	3.72		105	4.4		88.0	10.0	
PO4-P Water Soluble	mg/kg	3	1.06	0.939		6.54	3.66		1.75	1.58		12.5	5.75		3.47	1.43	
SO4 - S (PO4 Extr.)	mg/kg	36	4.67	0.975		4.70	1.25		10.6	1.72		4.50	1.22		28.9	4.82	
<b>Bases</b>																	
K Ammonium Acetate	mg/kg	81	89.0	10.5		190	11.5		134	8.9		380	53.5		155	11.0	
Ca Ammonium Acetate	mg/kg	77	682	82.0		847	70.0		2005	146		2301	287		4200	420	
Mg Ammonium Acetate	mg/kg	77	122	14.3		135	9.0		319	21.6		304	44.0		316	20.6	
Na Ammonium Acetate	mg/kg	60	16.4	6.60		20.4	6.35		17.0	6.04		17.7	6.40		21.8	6.75	
Bray Extractable K	mg/kg	4	95.0	3.41		159	4.0		118	4.5		277	8.5		132	2.9	
K- Olsen/Bicarb.	mg/kg	6	75.6	20.0		188	12.5		136	16.0		378	26.0		156	16.0	
K Modified Morgan	mg/kg	2	85.6	9.55		183	3.6		131	1.4		387	61.8		152	5.3	
K True Morgan	mg/kg	5	65.0	5.60		145	9.1		101	4.0		332	13.3		114	7.0	
Ca Modified Morgan	mg/kg	3	572	34.2		740	13.4		2350	44.4		2550	9.4		6905	99.0	
Aluminum KCL Extr.	mg/kg	4	0.296	0.167		8.35	2.17		0.132	0.127		0.169	0.164		0.055	0.050	

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<b>Mehlich-1 Multi Element (scoop)</b>																	
Scoop Soil Mass	g	6	5.00	0.000		5.00	0.000		5.00	0.000		5.00	0.000		5.00	0.000	
P	mg/kg	7	8.32	0.898		86.5	10.7		9.00	2.35		30.6	1.22		25.5	1.02	
K	mg/kg	7	69.5	9.06		139	5.5		110	7.75		266	17.4		106	10.4	
Ca	mg/kg	7	657	79.3		950	38.0		3240	302		2561	278		4928	456	
Mg	mg/kg	7	121	13.1		137	7.7		848	113		339	55.3		348	15.2	
Mn	mg/kg	7	16.7	1.80		90.0	5.86		47.8	6.95		72.1	6.63		11.3	1.40	
Zn	mg/kg	7	6.10	0.850		2.82	0.220		1.73	0.155		6.03	0.760		0.446	0.136	
<b>Mehlich-3 Multi-Element (scoop)</b>																	
Scoop Soil Mass	g	28	2.51	0.092		2.13	0.089		2.14	0.103		1.56	0.035		2.35	0.100	
Assumed Density	g/cm <sup>3</sup>	15	1.18	0.000		1.18	0.000		1.18	0.000		1.18	0.000		1.18	0.000	
Volume of Scoop	cm <sup>3</sup>	31	2.00	0.300		2.00	0.300		2.00	0.300		2.00	0.300		2.00	0.300	
Extractant Volume mL	mL	32	20.0	0.00		20.0	0.000		20.0	0.00		20.0	0.00		20.0	0.00	
P Colorimetric	mg/kg	20	15.7	1.63		232	16.4		28.6	2.00		72.7	3.55		39.4	1.57	
P ICP-AES	mg/kg	42	16.1	1.50		249	11.7		30.5	2.88		82.1	6.91		52.3	5.14	
K	mg/kg	49	105	10.4		202	11.5		152	13.0		384	37.8		172	18.0	
Ca	mg/kg	47	815	111		946	100		2543	226		2434	276		4844	307	
Mg	mg/kg	47	148	15.0		150	13.0		423	20.9		312	25.3		393	25.9	
Na	mg/kg	37	18.0	6.23		22.7	6.01		19.5	6.63		18.5	7.20		24.0	5.63	
S	mg/kg	37	9.14	2.24		12.7	2.82		24.4	3.25		9.71	2.74		49.8	6.20	
Al	mg/kg	23	537	51.0		1393	85.6		952	89.5		864	94.0		329	35.1	
Zn	mg/kg	38	8.80	0.750		3.28	0.312		3.25	0.280		7.35	0.764		4.23	0.295	
Mn	mg/kg	38	61.8	4.53		111	9.7		127	10.2		89.7	8.41		40.0	4.05	
Fe	mg/kg	36	128	10.1		416	41.1		276	19.8		284	24.7		151	13.5	
Cu	mg/kg	39	3.60	0.250		0.900	0.200		1.94	0.140		1.80	0.201		3.49	0.313	
B	mg/kg	33	0.300	0.150		0.500	0.315		1.50	0.300		0.701	0.211		4.35	0.600	

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<b>Micronutrients</b>																	
Zn - DTPA	mg/kg	74	4.43	0.547		1.84	0.160		1.17	0.132		5.57	0.815		1.90	0.210	
Mn - DTPA	mg/kg	57	10.5	1.56		67.4	5.64		11.6	3.78		50.8	8.20		8.00	0.880	
Fe - DTPA	mg/kg	59	15.6	2.68		83.0	11.1		43.0	7.41		102	16.0		31.9	3.78	
Cu - DTPA	mg/kg	62	1.64	0.220		0.503	0.046		0.715	0.115		1.30	0.200		1.20	0.140	
Zn - HCl	mg/kg	6	6.67	0.845		3.11	0.325		2.77	0.670		7.40	1.55		4.18	0.800	
Mn-H3PO4	mg/kg	12	10.5	0.925		72.6	5.69		35.2	6.75		53.3	6.11		10.1	1.17	
Cl - Ca(NO3)2 Extr.	mg/kg	17	2.54	1.54		5.76	1.70		27.0	2.41		4.83	1.83		49.2	4.75	
B - Hot Wat.	mg/kg	41	0.200	0.060		0.255	0.097		0.520	0.170		0.510	0.120		1.21	0.490	
B-DTPA/Sorbitol	mg/kg	11	0.180	0.040		0.190	0.090		0.500	0.090		0.210	0.070		1.88	0.120	
<b>Soil Organic Matter</b>																	
Soil Kjeldahl N	%	16	0.028	0.004		0.110	0.005		0.191	0.009		0.241	0.011		0.222	0.013	
Soil TN (combustion)	%	34	0.034	0.008		0.120	0.011		0.201	0.009		0.250	0.020		0.237	0.007	
Soil TOC (Combustion)	%	11	0.250	0.021		1.89	0.132		3.66	0.290		3.97	0.160		2.48	0.160	
Soil Total C (Combustion)	%	22	0.252	0.019		1.95	0.101		3.92	0.158		4.00	0.160		2.65	0.106	
SOM - Walkley-Black	%	37	0.500	0.100		3.20	0.200		3.74	0.180		6.28	0.590		4.06	0.213	
SOM - LOI (% Wt loss)	%	67	0.680	0.100		3.77	0.192		4.11	0.190		7.20	0.285		3.95	0.255	
CaCO3 Content	%	17	0.270	0.169		0.285	0.268		11.5	2.50		0.490	0.490		2.39	0.614	
CEC - Cation Displacement	cmol/kg	17	4.59	0.810		12.0	1.30		12.3	2.07		24.8	3.07		15.2	2.63	
CEC - Estimation	cmol/kg	16	5.25	0.750		10.6	3.33		14.3	1.23		17.5	1.87		25.9	1.60	
Soil Density (Scoop)	g/cc	13	1.49	0.034		1.22	0.040		1.23	0.050		0.910	0.043		1.37	0.055	
<b>Particle Size Analysis</b>																	
Sand 2000 - 50 um	%	40	78.4	3.13		75.2	3.01		66.5	2.66		25.6	6.62		73.4	2.93	
Silt 50 - 2 um	%	40	12.9	1.27		17.9	2.33		23.6	2.85		58.4	4.96		16.0	2.35	
Clay 2 - 0 um	%	40	8.2	1.20		6.2	1.20		10.0	2.50		17.2	3.24		10.3	1.55	

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