2009 North American Proficiency Testing Program
4th Quarter Report - November 22, 2009

Laboratory ID

Soil			Soil 2009-116			Soil 2009-117			Soil 2009-118			Soil 2009-119			Soil 2009-120		
Analysis	**Units**	***n***	**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	**46.1**	*3.10*		**34.9**	*2.00*		**60.0**	*4.20*		**60.1**	*5.73*		**58.0**	*2.30*	
pH - sp	Unit	31	**6.15**	*0.125*		**4.60**	*0.100*		**6.10**	*0.100*		**7.62**	*0.160*		**7.90**	*0.100*	
ECe - sp	dS/m	30	**0.290**	*0.020*		**0.730**	*0.046*		**0.334**	*0.083*		**0.551**	*0.066*		**10.1**	*0.99*	
HCO3 - sp	mmolc/L	12	**1.23**	*0.329*		**0.462**	*0.122*		**2.50**	*0.996*		**3.14**	*0.636*		**2.68**	*0.662*	
Ca - sp	mmolc/L	25	**1.56**	*0.180*		**3.13**	*0.351*		**2.02**	*0.545*		**4.09**	*0.732*		**24.2**	*2.29*	
Mg - sp	mmolc/L	25	**0.905**	*0.090*		**1.26**	*0.128*		**0.905**	*0.246*		**0.659**	*0.051*		**6.76**	*0.360*	
Na - sp	mmolc/L	24	**0.223**	*0.126*		**0.470**	*0.121*		**0.300**	*0.115*		**1.03**	*0.116*		**96.4**	*10.8*	
SAR - sp	value	21	**0.204**	*0.105*		**0.320**	*0.080*		**0.241**	*0.084*		**0.635**	*0.065*		**25.2**	*1.64*	
Cl - sp	mmolc/L	15	**0.320**	*0.101*		**0.450**	*0.088*		**0.330**	*0.077*		**1.48**	*0.076*		**30.5**	*3.26*	
SO4 - sp	mmolc/L	16	**0.971**	*0.142*		**0.643**	*0.083*		**0.402**	*0.054*		**0.454**	*0.120*		**86.3**	*4.83*	
NO_3 - sp	mmolc/L	12	**0.428**	*0.364*		**5.29**	*0.755*		**0.010**	*0.032*		**0.033**	*0.100*		**5.95**	*0.488*	
B - sp	mg/L	10	**0.077**	*0.024*		**0.267**	*0.057*		**0.058**	*0.018*		**0.094**	*0.024*		**14.7**	*1.55*	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	30	**0.235**	*0.060*		**0.250**	*0.060*		**0.130**	*0.028*		**0.515**	*0.080*		**5.22**	*0.455*	
Soil EC (1:2)	(dS/m)	45	**0.097**	*0.013*		**0.177**	*0.032*		**0.096**	*0.012*		**0.260**	*0.041*		**5.13**	*0.770*	
pH (1:1) Water	Unit	68	**6.40**	*0.10*		**4.75**	*0.09*		**6.29**	*0.07*		**8.00**	*0.09*		**8.02**	*0.06*	
pH (1:2) Water	Unit	28	**6.51**	*0.11*		**4.88**	*0.13*		**6.28**	*0.12*		**8.10**	*0.12*		**8.07**	*0.07*	
pH (1:1) 0.01M CaCl2	Unit	21	**5.90**	*0.09*		**4.30**	*0.08*		**5.66**	*0.05*		**7.66**	*0.10*		**7.96**	*0.09*	
pH (1:2) 0.01M CaCl2	Unit	11	**5.80**	*0.06*		**4.20**	*0.10*		**5.60**	*0.11*		**7.50**	*0.10*		**7.97**	*0.07*	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	39	**6.80**	*0.10*		**6.02**	*0.13*		**6.60**	*0.11*		**7.45**	*0.05*		**7.54**	*0.06*	
Adams-Evans Buf pH	Unit	11	**7.53**	*0.08*		**7.28**	*0.08*		**7.43**	*0.08*		**7.72**	*0.06*		**7.80**	*0.07*	
Woodruff Buf. pH	Unit	20	**6.68**	*0.06*		**5.98**	*0.08*		**6.50**	*0.03*		**7.13**	*0.03*		**7.20**	*0.05*	
Mehlich Buffer pH	Unit	10	**6.19**	*0.05*		**5.68**	*0.08*		**6.08**	*0.09*		**6.88**	*0.12*		**6.91**	*0.11*	
Sikora Buffer pH	Unit	11	**6.79**	*0.08*		**6.07**	*0.05*		**6.60**	*0.08*		**7.44**	*0.05*		**7.50**	*0.01*	
Titratable Acidity	cmol/kg	0															

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Soil			Soil 2009-116			Soil 2009-117			Soil 2009-118			Soil 2009-119			Soil 2009-120		
Analysis	**Units**	***n***	**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]**
Inorganic Nitrogen (NO3-N & NH4-N)																	
NO3-N Cd. Rd.	mg/kg	51	**6.96**	*0.578*		**30.4**	*2.00*		**1.10**	*0.360*		**2.17**	*0.305*		**56.6**	*2.75*	
NO3-N ISE	mg/kg	17	**7.00**	*1.00*		**28.2**	*4.56*		**2.30**	*0.900*		**4.29**	*2.04*		**60.6**	*12.8*	
NO3-N CTA	mg/kg	3	**8.00**	*1.10*		**30.0**	*3.00*		**3.50**	*0.500*		**2.30**	*0.300*		**48.5**	*2.10*	
NO3-N Ion Chr.	mg/kg	1	**61.9**			**1.68**						**10.9**			**0.00**		
NO3-N Other _____	mg/kg	8	**7.56**	*1.14*		**29.2**	*2.01*		**2.56**	*1.35*		**2.66**	*0.660*		**56.6**	*3.55*	
NH4 - N (KCl Extr.)	mg/kg	41	**20.0**	*1.42*		**22.6**	*1.64*		**7.97**	*0.855*		**5.51**	*0.582*		**5.60**	*0.648*	
Phosphorus and Sulfur																	
PO4-P Bray P (1:10)	mg/kg	45	**48.0**	*3.00*		**192**	*14.2*		**67.9**	*4.00*		**8.88**	*4.60*		**50.0**	*5.20*	
PO4-P Bray P1 (1:7)	mg/kg	5	**39.0**	*1.60*		**162**	*18.4*		**60.9**	*5.35*		**5.00**	*0.800*		**37.2**	*1.66*	
PO4-P Olsen/Bicarb	mg/kg	48	**29.6**	*2.38*		**84.7**	*9.70*		**37.0**	*4.10*		**15.3**	*1.20*		**20.4**	*1.47*	
PO4-P AB-DTPA	mg/kg	1	**14.7**	*0.00*		**59.3**	*0.00*		**19.3**	*0.00*		**4.98**	*0.00*		**8.64**	*0.00*	
PO4-P Modified Morgan	mg/kg	3	**7.00**	*0.300*		**9.70**	*0.700*		**11.0**	*1.00*		**6.00**	*0.400*		**60.0**	*5.00*	
PO4-P True Morgan	mg/kg	5	**9.40**	*0.600*		**11.0**	*0.600*		**12.2**	*0.20*		**9.00**	*0.920*		**64.5**	*4.50*	
PO4-P Mod. Kewlona	mg/kg	2	**24.6**	*4.20*		**123**	*1.1*		**47.5**	*0.77*		**24.2**	*3.14*		**29.9**	*2.53*	
PO4-P Stong Bray (1:10)	mg/kg	8	**90.3**	*6.25*		**238**	*20.5*		**106**	*4.3*		**86.7**	*7.50*		**299**	*41.5*	
PO4-P Water Soluble	mg/kg	2	**2.23**	*0.925*		**4.72**	*2.80*		**7.20**	*2.58*		**2.37**	*1.25*		**1.42**	*0.505*	
SO4 - S (PO4 Extr.)	mg/kg	35	**7.30**	*1.53*		**13.5**	*4.48*		**4.81**	*1.70*		**6.86**	*2.74*		**880**	*364*	
Bases																	
K Ammonium Acetate	mg/kg	68	**207**	*12.5*		**93.2**	*8.16*		**390**	*50.5*		**563**	*22.5*		**354**	*28.0*	
Ca Ammonium Acetate	mg/kg	66	**3004**	*203*		**438**	*57.4*		**2281**	*274*		**6614**	*654*		**8519**	*854*	
Mg Ammonium Acetate	mg/kg	66	**697**	*44.0*		**58.0**	*11.0*		**304**	*39.5*		**376**	*20.0*		**537**	*33.4*	
Na Ammonium Acetate	mg/kg	51	**11.0**	*5.00*		**14.2**	*5.28*		**14.0**	*3.73*		**59.8**	*7.80*		**3080**	*311*	
Bray Extractable K	mg/kg	3	**142**	*9.0*		**91.6**	*1.40*		**275**	*12.0*		**289**	*1.0*		**208**	*1.0*	
K- Olsen/Bicarb.	mg/kg	5	**151**	*6.0*		**99.0**	*5.00*		**364**	*14.6*		**332**	*19.0*		**210**	*8.0*	
K Modified Morgan	mg/kg	2	**221**	*12.0*		**84.0**	*8.00*		**458**	*17.5*		**537**	*20.0*		**334**	*64.5*	
K True Morgan	mg/kg	5	**122**	*2.0*		**73.1**	*4.90*		**337**	*4.0*		**219**	*13.3*		**153**	*4.0*	
Ca Modified Morgan	mg/kg	2	**3226**	*8.5*		**384**	*47.0*		**2658**	*16.5*		**39736**	*3031*		**9293**	*1448*	
Aluminum KCL Extr.	mg/kg	3	**0.917**	*0.317*		**41.5**	*1.47*		**0.744**	*0.444*		**0.577**	*0.577*		**0.397**	*0.397*	

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Mehlich-1 Multi Element (scoop)																	
Scoop Soil Mass	g	8	**5.00**	*0.00*		**5.00**	*0.00*		**5.00**	*0.00*		**5.00**	*0.00*		**5.00**	*0.00*	
P	mg/kg	9	**31.0**	*1.24*		**61.7**	*5.05*		**32.4**	*3.20*		**3.97**	*1.22*		**180**	*7.18*	
K	mg/kg	9	**109**	*4.36*		**79.9**	*11.3*		**269**	*35.3*		**132**	*8.9*		**123**	*19.4*	
Ca	mg/kg	9	**2525**	*154*		**438**	*38.0*		**2631**	*317*		**5570**	*189*		**4024**	*160*	
Mg	mg/kg	9	**532**	*47.2*		**53.0**	*7.27*		**334**	*56.2*		**232**	*11.7*		**405**	*18.5*	
Mn	mg/kg	9	**60.4**	*4.93*		**48.2**	*3.39*		**77.8**	*6.96*		**2.74**	*0.606*		**14.7**	*1.08*	
Zn	mg/kg	9	**3.75**	*0.110*		**2.23**	*0.248*		**5.92**	*0.517*		**0.046**	*0.046*		**0.493**	*0.265*	
Mehlich-3 Mult-Element (scoop)																	
Scoop Soil Mass	g	27	**2.00**	*0.189*		**2.35**	*0.115*		**1.65**	*0.157*		**2.01**	*0.115*		**2.25**	*0.202*	
Assumed Density	g/cm3	13	**1.18**	*0.000*		**1.18**	*0.000*		**1.18**	*0.000*		**1.18**	*0.000*		**1.18**	*0.000*	
Volume of Scoop	cm3	28	**2.00**	*0.300*		**2.00**	*0.300*		**2.00**	*0.300*		**2.00**	*0.300*		**2.00**	*0.300*	
Extractrant Volume mL	mL	27	**20.0**	*0.00*		**20.0**	*0.00*		**20.0**	*0.00*		**20.0**	*0.00*		**20.0**	*0.00*	
P Colorimetric	mg/kg	19	**55.1**	*2.39*		**188**	*14.0*		**72.3**	*4.30*		**48.3**	*4.73*		**72.0**	*2.88*	
P ICP-AES	mg/kg	39	**59.4**	*3.88*		**203**	*16.4*		**80.1**	*7.27*		**50.0**	*3.57*		**71.5**	*4.88*	
K	mg/kg	43	**212**	*14.5*		**103**	*11.1*		**405**	*46.8*		**576**	*34.7*		**368**	*28.5*	
Ca	mg/kg	41	**3198**	*222*		**462**	*57.6*		**2469**	*289*		**9037**	*1063*		**7913**	*866*	
Mg	mg/kg	41	**721**	*45.8*		**61.0**	*6.92*		**326**	*37.0*		**465**	*31.3*		**715**	*55.1*	
Na	mg/kg	33	**14.4**	*7.31*		**17.0**	*6.60*		**16.5**	*7.20*		**64.5**	*11.4*		**3066**	*372*	
S	mg/kg	33	**13.2**	*2.06*		**32.8**	*5.89*		**8.85**	*1.97*		**15.9**	*3.80*		**3012**	*593*	
Al	mg/kg	25	**540**	*55.7*		**1265**	*152*		**826**	*84.1*		**361**	*66.8*		**276**	*74.2*	
Zn	mg/kg	33	**5.58**	*0.450*		**2.71**	*0.220*		**7.83**	*0.930*		**1.77**	*0.172*		**3.43**	*0.330*	
Mn	mg/kg	34	**78.8**	*7.47*		**51.2**	*4.37*		**95.9**	*10.1*		**127**	*20.4*		**97.6**	*9.80*	
Fe	mg/kg	32	**377**	*38.2*		**324**	*42.8*		**270**	*35.9*		**75.3**	*8.62*		**81.2**	*10.6*	
Cu	mg/kg	35	**4.00**	*0.270*		**0.800**	*0.200*		**1.72**	*0.210*		**3.41**	*0.370*		**3.71**	*0.314*	
B	mg/kg	29	**0.900**	*0.300*		**0.582**	*0.218*		**0.600**	*0.205*		**1.79**	*0.314*		**44.1**	*4.39*	

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Micronutrients																	
Zn - DTPA	mg/kg	64	**3.50**	*0.280*		**1.80**	*0.220*		**5.42**	*0.700*		**0.733**	*0.092*		**1.59**	*0.161*	
Mn - DTPA	mg/kg	50	**61.0**	*5.56*		**41.1**	*3.21*		**62.5**	*8.47*		**12.4**	*1.61*		**7.40**	*1.11*	
Fe - DTPA	mg/kg	52	**145**	*19.3*		**148**	*28.0*		**96.9**	*11.3*		**8.60**	*1.10*		**7.96**	*1.19*	
Cu - DTPA	mg/kg	55	**2.56**	*0.260*		**0.58**	*0.140*		**1.29**	*0.186*		**1.61**	*0.150*		**2.00**	*0.200*	
Zn - HCl	mg/kg	4	**5.60**	*0.465*		**2.52**	*0.115*		**7.60**	*0.785*		**0.100**	*0.020*		**3.77**	*0.220*	
Mn-H3PO4	mg/kg	10	**42.4**	*3.00*		**40.5**	*2.90*		**65.1**	*5.39*		**4.56**	*0.476*		**13.0**	*1.16*	
Cl - Ca(NO3)2 Extr.	mg/kg	15	**2.83**	*2.32*		**5.10**	*1.60*		**3.80**	*1.28*		**27.0**	*4.73*		**558**	*109.3*	
B - Hot Wat.	mg/kg	38	**0.715**	*0.225*		**0.550**	*0.125*		**0.525**	*0.124*		**0.700**	*0.300*		**26.3**	*9.50*	
B-DTPA/Sorbitol	mg/kg	10	**0.248**	*0.135*		**0.300**	*0.103*		**0.225**	*0.060*		**1.11**	*0.145*		**33.8**	*7.44*	
Soil Organic Matter																	
Soil Kjeldahl N	%	16	**0.197**	*0.009*		**0.145**	*0.012*		**0.230**	*0.009*		**0.096**	*0.007*		**0.052**	*0.005*	
Soil TN (combustion)	%	29	**0.211**	*0.015*		**0.160**	*0.007*		**0.257**	*0.012*		**0.103**	*0.010*		**0.070**	*0.007*	
Soil TOC (Combustion)	%	9	**2.37**	*0.306*		**2.03**	*0.139*		**3.86**	*0.147*		**1.23**	*0.160*		**0.486**	*0.066*	
Soil Total C (Combustion)	%	20	**2.60**	*0.144*		**2.09**	*0.083*		**4.03**	*0.158*		**2.32**	*0.160*		**0.540**	*0.106*	
SOM - Walkley-Black	%	30	**4.13**	*0.325*		**3.60**	*0.253*		**6.05**	*0.625*		**1.80**	*0.120*		**0.800**	*0.092*	
SOM - LOI (% Wt loss)	%	60	**4.81**	*0.290*		**3.93**	*0.185*		**7.10**	*0.290*		**2.78**	*0.293*		**1.60**	*0.300*	
CaCO3 Content	%	10	**0.297**	*0.297*		**0.200**	*0.200*		**0.423**	*0.423*		**11.0**	*0.61*		**1.45**	*0.303*	
CEC - Cation Displacement	cmol/kg	14	**22.8**	*2.69*		**8.49**	*1.95*		**23.1**	*4.13*		**27.7**	*4.03*		**24.7**	*2.97*	
CEC - Estimation	cmol/kg	12	**21.4**	*0.95*		**7.65**	*4.32*		**16.0**	*1.00*		**39.2**	*2.85*		**65.0**	*2.60*	
Soil Density (Scoop)	g/cc	13	**1.09**	*0.046*		**1.34**	*0.020*		**0.889**	*0.050*		**1.09**	*0.052*		**1.28**	*0.055*	
Particle Size Analysis																	
Sand 2000 - 50 um	%	33	**12.2**	*3.13*		**75.5**	*3.01*		**22.0**	*2.66*		**8.0**	*4.80*		**38.4**	*2.93*	
Silt 50 - 2 um	%	33	**57.5**	*4.50*		**17.3**	*2.50*		**58.6**	*3.40*		**39.8**	*4.20*		**21.3**	*5.27*	
Clay 2 - 0 um	%	34	**31.0**	*2.55*		**7.2**	*2.15*		**19.5**	*2.75*		**50.0**	*3.18*		**39.3**	*3.71*	

1 - Values flagged exceed Warning Limits " * " 2.5x MAD (Median Absolute Deviation) and Control Limits " ** " 4 x MAD. "<" and "ND" values not recorded.
2 - Limits not compared to lab data for methods with < 7 labs reporting