2016 North American Proficiency Testing Program
2nd Quarter Report - July 11, 2016

Laboratory ID
General

Soil			Soil 2016-106			Soil 2016-107			Soil 2016-108			Soil 2016-109			Soil 2016-110		
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	**59.0**	*3.23*		**52.6**	*3.11*		**36.1**	*2.90*		**32.0**	*1.75*		**43.2**	*1.80*	
pH - sp	Unit	31	**7.57**	*0.090*		**6.66**	*0.120*		**6.51**	*0.140*		**6.90**	*0.100*		**7.03**	*0.070*	
ECe - sp	dS/m	30	**4.26**	*0.280*		**0.759**	*0.079*		**0.674**	*0.111*		**0.465**	*0.064*		**1.13**	*0.110*	
HCO3 - sp	mmolc/L	14	**4.74**	*0.940*		**3.36**	*0.651*		**4.23**	*0.724*		**2.36**	*0.520*		**4.34**	*0.787*	
Ca - sp	mmolc/L	27	**20.6**	*1.55*		**4.15**	*0.500*		**5.24**	*0.658*		**2.63**	*0.322*		**5.43**	*0.480*	
Mg - sp	mmolc/L	27	**15.6**	*2.00*		**2.05**	*0.280*		**0.810**	*0.122*		**1.00**	*0.130*		**2.23**	*0.170*	
Na - sp	mmolc/L	27	**17.2**	*1.43*		**0.880**	*0.130*		**0.144**	*0.013*		**0.300**	*0.040*		**0.130**	*0.010*	
SAR - sp	value	23	**4.00**	*0.180*		**0.500**	*0.040*		**0.100**	*0.017*		**0.210**	*0.030*		**0.100**	*0.017*	
Cl - sp	mmolc/L	16	**7.68**	*0.905*		**0.725**	*0.135*		**0.855**	*0.140*		**0.385**	*0.085*		**0.250**	*0.045*	
SO4 - sp	mmolc/L	17	**39.1**	*5.10*		**2.32**	*0.320*		**0.830**	*0.100*		**1.21**	*0.160*		**1.75**	*0.220*	
NO_3 - sp	mmolc/L	11	**3.66**	*0.650*		**0.100**	*0.024*		**0.030**	*0.024*		**0.102**	*0.022*		**4.29**	*1.02*	
B - sp	mg/L	15	**0.690**	*0.100*		**0.150**	*0.012*		**0.027**	*0.003*		**0.080**	*0.007*		**0.095**	*0.006*	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	36	**1.71**	*0.145*		**0.550**	*0.035*		**0.175**	*0.018*		**0.200**	*0.044*		**0.560**	*0.044*	
Soil EC (1:2)	(dS/m)	50	**1.40**	*0.163*		**0.319**	*0.043*		**0.114**	*0.014*		**0.130**	*0.018*		**0.380**	*0.040*	
pH (1:1) Water	Unit	90	**7.80**	*0.070*		**6.86**	*0.070*		**6.47**	*0.070*		**6.94**	*0.080*		**7.21**	*0.070*	
pH (1:2) Water	Unit	30	**7.91**	*0.095*		**6.94**	*0.080*		**6.51**	*0.100*		**7.00**	*0.080*		**7.29**	*0.090*	
pH (1:1) 0.01M CaCl2	Unit	26	**7.67**	*0.045*		**6.50**	*0.050*		**6.00**	*0.040*		**6.49**	*0.035*		**6.90**	*0.050*	
pH (1:2) 0.01M CaCl2	Unit	12	**7.66**	*0.115*		**6.52**	*0.035*		**5.98**	*0.075*		**6.44**	*0.045*		**6.90**	*0.095*	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	27	**7.50**	*0.044*		**6.99**	*0.070*		**7.16**	*0.070*		**7.13**	*0.076*		**7.14**	*0.080*	
Adams-Evans Buf pH	Unit	9	**7.78**	*0.050*		**7.59**	*0.055*		**7.79**	*0.035*		**7.85**	*0.055*		**7.70**	*0.060*	
Woodruff Buf. pH	Unit	23	**7.25**	*0.030*		**6.84**	*0.050*		**6.89**	*0.030*		**6.90**	*0.040*		**6.96**	*0.040*	
Mehlich Buffer pH	Unit	8	**6.94**	*0.045*		**6.41**	*0.030*		**6.42**	*0.025*		**6.52**	*0.030*		**6.60**	*0.045*	
Sikora Buffer pH	Unit	25	**7.53**	*0.030*		**6.98**	*0.040*		**7.17**	*0.030*		**7.23**	*0.040*		**7.17**	*0.030*	
Titratable Acidity	cmol/kg																

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Inorganic Nitrogen (NO3-N & NH4-N)												
NO3-N Cd. Rd.	mg/kg	62	**35.2**	*2.15*	**14.6**	*1.04*	**4.47**	*0.470*	**12.5**	*1.03*	**45.8**	*1.80*
NO3-N ISE	mg/kg	15	**34.1**	*4.20*	**14.7**	*2.20*	**5.50**	*1.50*	**14.0**	*2.25*	**46.0**	*4.12*
NO3-N CTA	mg/kg	1	**34.1**	*0.00*	**18.4**	*0.00*	**7.58**	*0.000*	**12.8**	*0.000*	**42.9**	*0.000*
NO3-N Ion Chr.	mg/kg	2	**34.6**	*0.400*	**14.0**	*0.00*	**4.64**	*0.265*	**12.4**	*0.400*	**44.6**	*0.600*
NO3-N Other _____	mg/kg	10	**31.3**	*3.13*	**14.4**	*1.09*	**4.52**	*0.575*	**11.9**	*1.45*	**44.0**	*3.19*
NH4 - N (KCl Extr.)	mg/kg	51	**15.0**	*1.60*	**69.1**	*4.44*	**7.86**	*0.870*	**9.33**	*1.08*	**172**	*15.0*
Phosphorus and Sulfur												
PO4-P Bray P (1:10)	mg/kg	44	**2.00**	*0.375*	**176**	*9.10*	**34.0**	*2.92*	**82.8**	*5.20*	**144**	*5.10*
PO4-P Bray P1 (1:7)	mg/kg	6	**2.35**	*1.48*	**130**	*13.1*	**31.4**	*1.62*	**62.8**	*6.01*	**103**	*14.0*
PO4-P Olsen/Bicarb	mg/kg	54	**14.8**	*1.48*	**129**	*11.0*	**17.6**	*1.33*	**30.8**	*3.55*	**88.0**	*8.00*
PO4-P AB-DTPA	mg/kg	2	**10.8**	*0.482*	**63.4**	*1.94*	**15.4**	*0.283*	**26.5**	*0.050*	**52.8**	*1.43*
PO4-P Modified Morgan	mg/kg	8	**45.6**	*4.05*	**41.8**	*4.40*	**6.40**	*0.555*	**7.19**	*0.225*	**27.5**	*3.90*
PO4-P True Morgan	mg/kg	7	**41.2**	*3.90*	**47.9**	*2.10*	**7.60**	*0.400*	**8.00**	*0.200*	**32.0**	*2.00*
PO4-P Mod. Kewlona	mg/kg	3	**40.0**	*3.10*	**120**	*10.0*	**24.0**	*1.00*	**51.4**	*4.40*	**100**	*2.00*
PO4-P Stong Bray (1:10)	mg/kg	9	**12.8**	*4.12*	**342**	*12.3*	**56.7**	*1.70*	**152**	*8.24*	**243**	*9.13*
PO4-P Water Soluble	mg/kg											
SO4 - S (PO4 Extr.)	mg/kg	32	**279**	*36.2*	**17.6**	*3.42*	**5.70**	*0.740*	**7.00**	*0.750*	**12.0**	*1.08*
Bases												
K Ammonium Acetate	mg/kg	77	**547**	*41.7*	**725**	*42.1*	**197**	*10.0*	**111**	*9.10*	**642**	*32.0*
Ca Ammonium Acetate	mg/kg	73	**5720**	*978*	**3030**	*208*	**1080**	*65.0*	**1000**	*100*	**3000**	*185*
Mg Ammonium Acetate	mg/kg	73	**1060**	*89.6*	**663**	*47.0*	**62.8**	*5.87*	**109**	*11.0*	**422**	*26.0*
Na Ammonium Acetate	mg/kg	61	**459**	*31.2*	**40.0**	*4.92*	**9.00**	*1.27*	**10.3**	*2.46*	**10.0**	*1.41*
Bray Extractable K	mg/kg	4	**380**	*12.0*	**484**	*32.2*	**175**	*11.6*	**114**	*9.73*	**425**	*14.9*
K- Olsen/Bicarb.	mg/kg	6	**515**	*19.0*	**565**	*8.15*	**196**	*10.5*	**112**	*3.50*	**493**	*11.4*
K Modified Morgan	mg/kg	6	**501**	*32.7*	**641**	*51.0*	**185**	*7.97*	**96.9**	*6.39*	**602**	*60.9*
K True Morgan	mg/kg	6	**388**	*38.0*	**453**	*46.0*	**154**	*8.50*	**94.4**	*3.40*	**409**	*31.5*
Ca Modified Morgan	mg/kg	5	**25000**	*3700*	**2950**	*217*	**1070**	*83.0*	**916**	*34.0*	**2980**	*28.0*
Aluminum KCL Extr.	mg/kg	4	**0.892**	*0.109*	**0.650**	*0.350*	**0.579**	*0.179*	**1.15**	*0.150*	**0.444**	*0.244*

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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*
P	mg/kg	9	**4.38**	*1.09*		**127**	*15.0*		**32.8**	*1.22*		**44.3**	*5.95*		**64.6**	*8.70*
K	mg/kg	9	**225**	*12.9*		**443**	*34.6*		**148**	*9.30*		**108**	*5.69*		**385**	*25.8*
Ca	mg/kg	9	**4980**	*681*		**2590**	*191*		**1100**	*63.0*		**1360**	*15.0*		**3120**	*251*
Mg	mg/kg	9	**826**	*56.5*		**564**	*36.9*		**62.2**	*4.43*		**127**	*5.03*		**426**	*25.5*
Mn	mg/kg	8	**9.89**	*0.760*		**193**	*21.1*		**104**	*6.43*		**78.5**	*7.82*		**308**	*20.6*
Zn	mg/kg	7	**0.150**	*0.030*		**11.2**	*0.890*		**3.81**	*0.275*		**14.2**	*1.38*		**3.30**	*0.400*
Mehlich-3 Mult-Element (scoop)														
Scoop Soil Mass	g	24	**1.94**	*0.075*		**2.12**	*0.115*		**2.12**	*0.130*		**2.58**	*0.095*		**2.02**	*0.080*
Assumed Density	g/cm3	14	**0.983**	*0.042*		**1.10**	*0.069*		**1.13**	*0.053*		**1.28**	*0.048*		**1.07**	*0.090*
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*
Extractrant Volume mL	mL	21	**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*
P Colorimetric	mg/kg	14	**46.5**	*3.03*		**242**	*12.4*		**36.1**	*2.05*		**91.3**	*5.76*		**179**	*11.7*
P ICP-AES	mg/kg	51	**48.6**	*2.36*		**268**	*17.6*		**42.3**	*3.10*		**104**	*6.90*		**199**	*10.0*
K	mg/kg	55	**572**	*33.1*		**748**	*41.5*		**201**	*13.2*		**123**	*9.00*		**664**	*33.5*
Ca	mg/kg	52	**16700**	*2040*		**3370**	*246*		**1140**	*79.0*		**1210**	*123*		**3360**	*217*
Mg	mg/kg	52	**1510**	*77.3*		**706**	*46.8*		**63.0**	*6.76*		**130**	*10.8*		**459**	*24.7*
Na	mg/kg	38	**490**	*54.5*		**41.3**	*6.70*		**8.78**	*1.63*		**12.4**	*2.13*		**10.2**	*2.34*
S	mg/kg	43	**442**	*42.2*		**29.7**	*2.62*		**11.8**	*1.20*		**17.2**	*2.16*		**21.2**	*1.80*
Al	mg/kg	30	**45.9**	*3.32*		**797**	*32.3*		**546**	*45.0*		**876**	*66.4*		**772**	*52.0*
Zn	mg/kg	48	**6.60**	*0.510*		**10.7**	*0.980*		**4.40**	*0.325*		**15.4**	*1.35*		**3.68**	*0.365*
Mn	mg/kg	48	**145**	*8.97*		**231**	*13.5*		**251**	*23.1*		**79.8**	*4.53*		**321**	*19.0*
Fe	mg/kg	46	**40.6**	*3.25*		**427**	*50.6*		**112**	*10.0*		**431**	*48.7*		**399**	*40.5*
Cu	mg/kg	48	**3.71**	*0.305*		**2.69**	*0.585*		**4.51**	*0.295*		**4.82**	*0.695*		**3.04**	*0.320*
B	mg/kg	38	**6.74**	*0.770*		**1.20**	*0.200*		**0.380**	*0.080*		**0.770**	*0.182*		**1.12**	*0.188*

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Micronutrients												
Zn - DTPA	mg/kg	65	**2.92**	*0.220*	**6.64**	*0.460*	**2.20**	*0.200*	**6.31**	*0.640*	**1.77**	*0.120*
Mn - DTPA	mg/kg	52	**66.2**	*6.46*	**197**	*18.9*	**70.5**	*8.35*	**34.6**	*4.89*	**220**	*18.5*
Fe - DTPA	mg/kg	55	**26.6**	*2.26*	**167**	*20.0*	**18.0**	*2.80*	**116**	*16.6*	**137**	*15.1*
Cu - DTPA	mg/kg	55	**2.70**	*0.310*	**4.36**	*0.460*	**2.65**	*0.230*	**2.94**	*0.330*	**2.12**	*0.160*
Zn - HCl	mg/kg	3	**0.420**	*0.320*	**16.3**	*0.130*	**4.19**	*0.060*	**15.5**	*1.27*	**3.14**	*1.37*
Mn-H3PO4	mg/kg	9	**11.9**	*1.87*	**157**	*6.93*	**83.6**	*9.18*	**56.5**	*2.50*	**222**	*28.2*
Cl - Ca(NO3)2 Extr.	mg/kg	17	**140**	*9.00*	**11.0**	*1.30*	**10.5**	*1.01*	**4.40**	*1.07*	**3.50**	*0.400*
B - Hot Wat.	mg/kg	34	**2.91**	*0.680*	**0.740**	*0.087*	**0.196**	*0.027*	**0.301**	*0.070*	**0.570**	*0.120*
B-DTPA/Sorbitol	mg/kg	18	**4.53**	*0.293*	**0.659**	*0.120*	**0.100**	*0.020*	**0.275**	*0.028*	**0.465**	*0.070*
Soil Organic Matter												
Soil Kjeldahl N	%	15	**0.310**	*0.018*	**0.207**	*0.014*	**0.103**	*0.004*	**0.120**	*0.007*	**0.233**	*0.012*
Soil TN (combustion)	%	42	**0.322**	*0.018*	**0.210**	*0.017*	**0.102**	*0.009*	**0.122**	*0.010*	**0.240**	*0.013*
Soil TOC (Combustion)	%	8	**3.81**	*0.200*	**2.08**	*0.041*	**1.07**	*0.040*	**1.46**	*0.133*	**2.46**	*0.070*
Soil Total C (Combustion)	%	32	**5.19**	*0.216*	**2.05**	*0.050*	**1.10**	*0.040*	**1.51**	*0.075*	**2.47**	*0.073*
SOM - Walkley-Black	%	25	**5.94**	*0.500*	**3.50**	*0.200*	**2.00**	*0.100*	**2.80**	*0.330*	**4.13**	*0.286*
SOM - LOI (% Wt loss)	%	71	**5.79**	*0.390*	**4.06**	*0.260*	**2.23**	*0.120*	**2.70**	*0.120*	**4.53**	*0.235*
Other												
CaCO3 Content	%	11	**14.6**	*1.60*	**0.833**	*0.143*	**0.42**	*0.080*	**0.900**	*0.184*	**0.881**	*0.095*
CEC - Cation Displacement	cmol/kg	17	**28.0**	*3.80*	**26.5**	*2.37*	**7.75**	*0.650*	**7.05**	*0.950*	**22.4**	*2.61*
CEC - Estimation	cmol/kg	12	**40.4**	*5.00*	**25.3**	*1.55*	**7.10**	*0.800*	**6.90**	*1.25*	**21.7**	*0.730*
Soil Density (Scoop)	g/cc	11	**1.10**	*0.020*	**1.23**	*0.030*	**1.22**	*0.030*	**1.46**	*0.040*	**1.19**	*0.040*
Particle Size Analysis-Hydrometer												
Sand 2000 - 50 um	%	34	**43.1**	*4.70*	**15.9**	*3.50*	**30.3**	*2.65*	**86.0**	*1.80*	**31.4**	*2.65*
Silt 50 - 2 um	%	34	**34.5**	*3.55*	**52.6**	*4.20*	**54.9**	*3.35*	**8.40**	*1.65*	**44.5**	*2.72*
Clay 2 - 0 um	%	34	**22.0**	*4.90*	**32.3**	*2.50*	**13.8**	*1.80*	**5.02**	*1.00*	**24.0**	*2.90*
Particle Size Analysis- Pipette												
Sand 2000 - 50 um	%	6	**38.2**	*3.11*	**8.85**	*3.70*	**25.3**	*0.950*	**88.3**	*1.20*	**26.5**	*2.95*
Silt 50 - 2 um	%	6	**38.0**	*3.60*	**56.3**	*5.15*	**60.9**	*1.80*	**8.00**	*2.96*	**44.8**	*3.65*
Clay 2 - 0 um	%	6	**24.4**	*3.45*	**33.9**	*3.41*	**13.1**	*1.75*	**4.10**	*0.225*	**26.9**	*3.10*
Solvita CO2	ppm	8	**43.9**	*16.8*	**95.0**	*24.7*	**82.5**	*33.0*	**51.1**	*24.4*	**76.5**	*30.1*

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