2015 North American Proficiency Testing Program
4th Quarter Report - January 15, 2016

Laboratory ID
General

Soil			Soil 2015-116			Soil 2015-117			Soil 2015-118			Soil 2015-119			Soil 2015-120		
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	%	21	**31.6**	*2.60*		**37.5**	*1.67*		**55.3**	*2.90*		**26.0**	*2.00*		**61.0**	*3.00*	
pH - sp	Unit	30	**7.68**	*0.165*		**6.89**	*0.130*		**6.35**	*0.145*		**7.50**	*0.155*		**5.94**	*0.165*	
ECe - sp	dS/m	29	**0.560**	*0.060*		**0.462**	*0.034*		**0.930**	*0.110*		**0.550**	*0.060*		**0.420**	*0.050*	
HCO3 - sp	mmolc/L	14	**3.10**	*0.356*		**1.78**	*0.241*		**1.37**	*0.194*		**2.74**	*0.426*		**0.600**	*0.078*	
Ca - sp	mmolc/L	27	**3.70**	*0.750*		**3.12**	*0.330*		**5.65**	*0.560*		**2.13**	*0.430*		**1.87**	*0.380*	
Mg - sp	mmolc/L	26	**0.822**	*0.122*		**0.960**	*0.125*		**2.10**	*0.200*		**1.90**	*0.240*		**0.592**	*0.088*	
Na - sp	mmolc/L	27	**0.830**	*0.090*		**0.525**	*0.080*		**1.00**	*0.110*		**1.14**	*0.160*		**0.260**	*0.040*	
SAR - sp	value	25	**0.550**	*0.050*		**0.400**	*0.060*		**0.500**	*0.030*		**0.820**	*0.120*		**0.228**	*0.028*	
Cl - sp	mmolc/L	18	**1.07**	*0.165*		**0.205**	*0.023*		**0.404**	*0.067*		**0.410**	*0.040*		**0.395**	*0.085*	
SO4 - sp	mmolc/L	20	**0.906**	*0.106*		**0.765**	*0.120*		**0.856**	*0.080*		**0.740**	*0.090*		**0.905**	*0.065*	
NO_3 - sp	mmolc/L	10	**0.270**	*0.065*		**1.46**	*0.307*		**5.58**	*1.13*		**1.40**	*0.210*		**1.73**	*0.416*	
B - sp	mg/L	13	**0.103**	*0.013*		**0.066**	*0.016*		**0.029**	*0.003*		**0.072**	*0.016*		**0.080**	*0.010*	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	38	**0.228**	*0.028*		**0.250**	*0.035*		**0.530**	*0.050*		**0.163**	*0.024*		**0.200**	*0.030*	
Soil EC (1:2)	(dS/m)	49	**0.158**	*0.025*		**0.140**	*0.020*		**0.302**	*0.040*		**0.107**	*0.017*		**0.150**	*0.025*	
pH (1:1) Water	Unit	89	**7.96**	*0.080*		**7.17**	*0.080*		**6.46**	*0.060*		**7.69**	*0.090*		**5.90**	*0.070*	
pH (1:2) Water	Unit	34	**8.05**	*0.160*		**7.18**	*0.180*		**6.56**	*0.143*		**7.75**	*0.125*		**5.96**	*0.098*	
pH (1:1) 0.01M CaCl2	Unit	24	**7.41**	*0.090*		**6.64**	*0.075*		**6.12**	*0.060*		**7.15**	*0.050*		**5.42**	*0.040*	
pH (1:2) 0.01M CaCl2	Unit	12	**7.37**	*0.060*		**6.70**	*0.100*		**6.19**	*0.085*		**7.04**	*0.105*		**5.39**	*0.090*	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	25	**7.50**	*0.040*		**7.29**	*0.054*		**6.97**	*0.030*		**7.49**	*0.080*		**6.53**	*0.133*	
Adams-Evans Buf pH	Unit	8	**7.90**	*0.040*		**7.75**	*0.050*		**7.63**	*0.040*		**7.98**	*0.060*		**7.32**	*0.070*	
Woodruff Buf. pH	Unit	22	**7.10**	*0.030*		**6.99**	*0.040*		**6.80**	*0.025*		**7.03**	*0.035*		**6.49**	*0.080*	
Mehlich Buffer pH	Unit	6	**6.70**	*0.040*		**6.48**	*0.025*		**6.27**	*0.025*		**6.65**	*0.040*		**6.02**	*0.040*	
Sikora Buffer pH	Unit	24	**7.50**	*0.040*		**7.26**	*0.050*		**6.90**	*0.085*		**7.49**	*0.045*		**6.52**	*0.085*	
Titratable Acidity	cmol/kg																

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Inorganic Nitrogen (NO3-N & NH4-N)												
NO3-N Cd. Rd.	mg/kg	60	**1.97**	*0.375*	**9.79**	*0.720*	**50.8**	*2.79*	**5.80**	*0.630*	**19.5**	*2.11*
NO3-N ISE	mg/kg	15	**3.00**	*0.461*	**9.26**	*1.51*	**46.0**	*3.50*	**7.10**	*1.02*	**17.0**	*4.00*
NO3-N CTA	mg/kg	1	**2.18**	*0.000*	**9.20**	*0.000*	**52.5**	*0.000*	**6.58**	*0.000*	**20.8**	*0.000*
NO3-N Ion Chr.	mg/kg	2	**1.85**	*0.155*	**10.4**	*0.135*	**56.4**	*2.64*	**5.98**	*0.325*	**22.1**	*0.525*
NO3-N Other _____	mg/kg	11	**2.30**	*0.540*	**10.2**	*1.60*	**53.7**	*1.63*	**6.46**	*0.460*	**19.1**	*1.40*
NH4 - N (KCl Extr.)	mg/kg	49	**2.40**	*0.402*	**17.0**	*1.50*	**5.78**	*0.770*	**14.4**	*1.37*	**4.23**	*0.490*
Phosphorus and Sulfur												
PO4-P Bray P (1:10)	mg/kg	47	**44.2**	*2.79*	**46.9**	*3.45*	**11.6**	*0.990*	**40.6**	*3.35*	**137**	*19.3*
PO4-P Bray P1 (1:7)	mg/kg	8	**37.8**	*2.27*	**42.4**	*1.86*	**8.32**	*1.74*	**31.5**	*2.15*	**59.5**	*9.69*
PO4-P Olsen/Bicarb	mg/kg	53	**17.1**	*2.22*	**23.2**	*1.80*	**8.80**	*0.800*	**17.5**	*1.61*	**54.5**	*6.47*
PO4-P AB-DTPA	mg/kg	2	**10.9**	*0.033*	**10.5**	*0.49*	**7.82**	*0.207*	**18.2**	*3.96*	**24.7**	*1.11*
PO4-P Modified Morgan	mg/kg	7	**41.2**	*2.80*	**7.80**	*1.25*	**2.20**	*0.440*	**13.6**	*2.10*	**6.20**	*1.47*
PO4-P True Morgan	mg/kg	7	**41.0**	*2.20*	**10.0**	*0.400*	**2.20**	*0.200*	**14.6**	*0.400*	**5.80**	*0.400*
PO4-P Mod. Kewlona	mg/kg	3	**27.0**	*1.70*	**34.0**	*0.900*	**8.00**	*0.780*	**23.6**	*0.400*	**74.0**	*9.30*
PO4-P Stong Bray (1:10)	mg/kg	8	**373**	*43.6*	**86.2**	*2.50*	**34.5**	*2.15*	**77.5**	*6.20*	**232**	*20.0*
PO4-P Water Soluble	mg/kg											
SO4 - S (PO4 Extr.)	mg/kg	29	**6.00**	*1.35*	**5.00**	*0.495*	**8.03**	*1.53*	**4.00**	*1.00*	**19.0**	*3.23*
Bases												
K Ammonium Acetate	mg/kg	73	**238**	*12.1*	**183**	*12.0*	**112**	*5.30*	**99.0**	*9.02*	**336**	*56.4*
Ca Ammonium Acetate	mg/kg	68	**3180**	*307*	**2600**	*207*	**3360**	*139*	**615**	*63.1*	**882**	*119*
Mg Ammonium Acetate	mg/kg	68	**178**	*11.0*	**349**	*22.5*	**510**	*21.1*	**194**	*15.8*	**71.8**	*9.85*
Na Ammonium Acetate	mg/kg	55	**26.9**	*2.90*	**25.0**	*4.25*	**47.5**	*3.78*	**22.7**	*3.46*	**13.9**	*1.57*
Bray Extractable K	mg/kg	4	**203**	*3.50*	**132**	*3.00*	**68.2**	*6.59*	**103**	*4.70*	**231**	*15.5*
K- Olsen/Bicarb.	mg/kg	6	**179**	*5.96*	**108**	*4.00*	**78.7**	*1.70*	**86.2**	*3.10*	**348**	*4.50*
K Modified Morgan	mg/kg	6	**220**	*14.3*	**166**	*5.25*	**111**	*7.50*	**88.5**	*5.19*	**362**	*21.4*
K True Morgan	mg/kg	6	**141**	*6.00*	**74.1**	*6.00*	**61.3**	*5.50*	**77.7**	*6.20*	**322**	*6.50*
Ca Modified Morgan	mg/kg	5	**4890**	*539*	**2470**	*104*	**3560**	*149*	**589**	*65.7*	**946**	*151*
Aluminum KCL Extr.	mg/kg	4	**0.410**	*0.279*	**0.500**	*0.179*	**0.600**	*0.400*	**0.800**	*0.692*	**1.70**	*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*	
P	mg/kg	8	**200**	*36.7*		**56.0**	*6.49*		**18.1**	*2.65*		**44.9**	*3.53*	
K	mg/kg	8	**130**	*7.59*		**84.4**	*6.58*		**51.8**	*2.76*		**86.7**	*9.20*	
Ca	mg/kg	8	**4460**	*658*		**1890**	*203*		**2600**	*114.5*		**640**	*116*	
Mg	mg/kg	8	**214**	*18.8*		**273**	*41.6*		**397**	*35.4*		**198**	*36.6*	
Mn	mg/kg	7	**26.3**	*4.22*		**62.1**	*6.56*		**36.4**	*3.49*		**72.1**	*8.95*	
Zn	mg/kg	7	**2.02**	*0.400*		**3.04**	*0.232*		**1.70**	*0.220*		**36.4**	*3.58*	
Mehlich-3 Mult-Element (scoop)														
Scoop Soil Mass	g	24	**2.29**	*0.146*		**2.34**	*0.130*		**2.00**	*0.115*		**2.56**	*0.108*	
Assumed Density	g/cm3	17	**1.19**	*0.040*		**1.24**	*0.060*		**1.08**	*0.100*		**1.30**	*0.103*	
Volume of Scoop	cm3	26	**2.00**	*0.000*		**2.00**	*0.000*		**2.00**	*0.000*		**2.00**	*0.000*	
Extractrant Volume mL	mL	26	**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*	
P Colorimetric	mg/kg	15	**57.0**	*3.33*		**50.0**	*1.30*		**12.3**	*0.730*		**53.6**	*3.27*	
P ICP-AES	mg/kg	49	**59.5**	*3.52*		**55.0**	*3.00*		**19.0**	*1.30*		**56.7**	*4.22*	
K	mg/kg	55	**267**	*16.0*		**198**	*9.51*		**106**	*5.67*		**114**	*11.3*	
Ca	mg/kg	51	**4240**	*298*		**2690**	*216*		**3440**	*210*		**735**	*66.8*	
Mg	mg/kg	51	**232**	*17.9*		**400**	*21.0*		**524**	*31.8*		**239**	*19.8*	
Na	mg/kg	36	**27.0**	*3.29*		**24.8**	*3.96*		**44.1**	*4.35*		**25.0**	*5.11*	
S	mg/kg	43	**11.8**	*1.55*		**9.14**	*1.14*		**13.8**	*1.30*		**7.70**	*1.01*	
Al	mg/kg	33	**322**	*30.0*		**650**	*47.0*		**676**	*48.6*		**400**	*42.0*	
Zn	mg/kg	47	**3.20**	*0.290*		**4.88**	*0.340*		**2.30**	*0.200*		**40.7**	*4.23*	
Mn	mg/kg	47	**186**	*13.3*		**175**	*12.3*		**70.9**	*6.28*		**79.9**	*6.90*	
Fe	mg/kg	45	**75.5**	*5.26*		**84.0**	*6.04*		**198**	*19.0*		**205**	*18.0*	
Cu	mg/kg	47	**5.30**	*0.470*		**2.50**	*0.200*		**3.35**	*0.310*		**24.8**	*2.80*	
B	mg/kg	35	**0.970**	*0.107*		**0.590**	*0.105*		**0.561**	*0.131*		**0.464**	*0.052*	

Scoop Soil Mass	g	5	**5.00**	*0.000*		**5.00**	*0.000*		**5.00**	*0.000*		**5.00**	*0.000*	
P	mg/kg	8	**200**	*36.7*		**56.0**	*6.49*		**18.1**	*2.65*		**44.9**	*3.53*	
K	mg/kg	8	**130**	*7.59*		**84.4**	*6.58*		**51.8**	*2.76*		**86.7**	*9.20*	
Ca	mg/kg	8	**4460**	*658*		**1890**	*203*		**2600**	*114.5*		**640**	*116*	
Mg	mg/kg	8	**214**	*18.8*		**273**	*41.6*		**397**	*35.4*		**198**	*36.6*	
Mn	mg/kg	7	**26.3**	*4.22*		**62.1**	*6.56*		**36.4**	*3.49*		**72.1**	*8.95*	
Zn	mg/kg	7	**2.02**	*0.400*		**3.04**	*0.232*		**1.70**	*0.220*		**36.4**	*3.58*	

Mehlich-3 Mult-Element (scoop)

Scoop Soil Mass	g	24	**2.29**	*0.146*		**2.34**	*0.130*		**2.00**	*0.115*		**2.56**	*0.108*	
Assumed Density	g/cm3	17	**1.19**	*0.040*		**1.24**	*0.060*		**1.08**	*0.100*		**1.30**	*0.103*	
Volume of Scoop	cm3	26	**2.00**	*0.000*		**2.00**	*0.000*		**2.00**	*0.000*		**2.00**	*0.000*	
Extractrant Volume mL	mL	26	**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*		**20.0**	*0.000*	
P Colorimetric	mg/kg	15	**57.0**	*3.33*		**50.0**	*1.30*		**12.3**	*0.730*		**53.6**	*3.27*	
P ICP-AES	mg/kg	49	**59.5**	*3.52*		**55.0**	*3.00*		**19.0**	*1.30*		**56.7**	*4.22*	
K	mg/kg	55	**267**	*16.0*		**198**	*9.51*		**106**	*5.67*		**114**	*11.3*	
Ca	mg/kg	51	**4240**	*298*		**2690**	*216*		**3440**	*210*		**735**	*66.8*	
Mg	mg/kg	51	**232**	*17.9*		**400**	*21.0*		**524**	*31.8*		**239**	*19.8*	
Na	mg/kg	36	**27.0**	*3.29*		**24.8**	*3.96*		**44.1**	*4.35*		**25.0**	*5.11*	
S	mg/kg	43	**11.8**	*1.55*		**9.14**	*1.14*		**13.8**	*1.30*		**7.70**	*1.01*	
Al	mg/kg	33	**322**	*30.0*		**650**	*47.0*		**676**	*48.6*		**400**	*42.0*	
Zn	mg/kg	47	**3.20**	*0.290*		**4.88**	*0.340*		**2.30**	*0.200*		**40.7**	*4.23*	
Mn	mg/kg	47	**186**	*13.3*		**175**	*12.3*		**70.9**	*6.28*		**79.9**	*6.90*	
Fe	mg/kg	45	**75.5**	*5.26*		**84.0**	*6.04*		**198**	*19.0*		**205**	*18.0*	
Cu	mg/kg	47	**5.30**	*0.470*		**2.50**	*0.200*		**3.35**	*0.310*		**24.8**	*2.80*	
B	mg/kg	35	**0.970**	*0.107*		**0.590**	*0.105*		**0.561**	*0.131*		**0.464**	*0.052*	

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Micronutrients												
Zn - DTPA	mg/kg	64	**1.28**	*0.090*	**2.30**	*0.190*	**1.50**	*0.100*	**17.5**	*1.91*	**2.22**	*0.391*
Mn - DTPA	mg/kg	50	**9.99**	*1.98*	**48.4**	*5.36*	**29.4**	*3.25*	**48.6**	*4.62*	**11.2**	*1.95*
Fe - DTPA	mg/kg	53	**8.16**	*0.940*	**10.0**	*1.00*	**62.3**	*6.30*	**38.5**	*6.33*	**47.7**	*9.70*
Cu - DTPA	mg/kg	52	**2.12**	*0.202*	**1.25**	*0.085*	**2.50**	*0.200*	**15.6**	*1.93*	**2.77**	*0.495*
Zn - HCl	mg/kg	3	**3.52**	*0.100*	**4.72**	*0.050*	**2.47**	*0.050*	**38.0**	*5.29*	**4.27**	*0.050*
Mn-H3PO4	mg/kg	8	**22.6**	*3.70*	**50.4**	*2.05*	**26.4**	*3.24*	**64.0**	*4.42*	**14.2**	*2.33*
Cl - Ca(NO3)2 Extr.	mg/kg	17	**14.0**	*1.00*	**2.50**	*0.275*	**8.10**	*0.770*	**4.65**	*0.516*	**7.40**	*1.40*
B - Hot Wat.	mg/kg	29	**0.492**	*0.063*	**0.460**	*0.067*	**0.349**	*0.053*	**0.233**	*0.038*	**0.367**	*0.083*
B-DTPA/Sorbitol	mg/kg	17	**0.480**	*0.034*	**0.280**	*0.031*	**0.200**	*0.034*	**0.160**	*0.015*	**0.183**	*0.021*
Soil Organic Matter												
Soil Kjeldahl N	%	16	**0.074**	*0.004*	**0.075**	*0.005*	**0.187**	*0.012*	**0.041**	*0.005*	**0.196**	*0.012*
Soil TN (combustion)	%	40	**0.077**	*0.007*	**0.080**	*0.010*	**0.200**	*0.013*	**0.043**	*0.007*	**0.214**	*0.013*
Soil TOC (Combustion)	%	8	**0.770**	*0.040*	**0.675**	*0.039*	**2.09**	*0.075*	**0.363**	*0.021*	**2.51**	*0.105*
Soil Total C (Combustion)	%	30	**0.875**	*0.022*	**0.682**	*0.025*	**2.10**	*0.060*	**0.380**	*0.021*	**2.52**	*0.058*
SOM - Walkley-Black	%	28	**1.30**	*0.110*	**1.20**	*0.096*	**3.31**	*0.270*	**0.700**	*0.090*	**4.10**	*0.375*
SOM - LOI (% Wt loss)	%	75	**1.48**	*0.130*	**1.63**	*0.140*	**4.30**	*0.250*	**0.780**	*0.080*	**5.20**	*0.230*
Other												
CaCO3 Content	%	13	**1.29**	*0.290*	**0.500**	*0.083*	**0.480**	*0.099*	**0.305**	*0.048*	**0.595**	*0.134*
CEC - Cation Displacement	cmol/kg	14	**10.8**	*1.20*	**15.5**	*1.18*	**24.8**	*3.25*	**3.91**	*0.830*	**14.3**	*2.06*
CEC - Estimation	cmol/kg	14	**18.5**	*1.50*	**17.6**	*1.89*	**22.6**	*2.00*	**5.55**	*0.735*	**11.0**	*1.51*
Soil Density (Scoop)	g/cc	15	**1.33**	*0.040*	**1.38**	*0.030*	**1.14**	*0.050*	**1.47**	*0.034*	**0.860**	*0.056*
Particle Size Analysis-Hydrometer												
Sand 2000 - 50 um	%	36	**47.9**	*3.10*	**38.9**	*4.35*	**11.9**	*1.73*	**85.4**	*2.05*	**20.0**	*3.50*
Silt 50 - 2 um	%	36	**37.4**	*2.95*	**39.4**	*5.20*	**57.3**	*4.05*	**7.75**	*1.75*	**58.0**	*4.10*
Clay 2 - 0 um	%	36	**15.9**	*2.10*	**22.0**	*1.15*	**30.2**	*2.75*	**7.69**	*1.49*	**21.0**	*2.97*
Particle Size Analysis- Pipette												
Sand 2000 - 50 um	%	4	**50.2**	*0.950*	**40.4**	*2.35*	**3.32**	*0.505*	**86.2**	*0.220*	**15.3**	*1.30*
Silt 50 - 2 um	%	4	**34.7**	*1.30*	**37.1**	*3.35*	**64.4**	*1.000*	**8.10**	*0.900*	**68.0**	*2.30*
Clay 2 - 0 um	%	4	**14.9**	*1.45*	**21.5**	*1.46*	**31.3**	*1.02*	**6.00**	*0.300*	**16.7**	*1.34*
Solvita CO2	ppm	10	**13.1**	*1.21*	**19.2**	*1.5*	**43.9**	*4.22*	**8.10**	*1.90*	**45.7**	*8.06*

1 - Values flagged exceed Warning Limits " * " 2.5 x 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.