2019 North American Proficiency Testing Program
Quarter 1 Soil Report - Tuesday, April 16, 2019

Laboratory ID
General

Soil			Soil 2019-101			Soil 2019-102			Soil 2019-103			Soil 2019-104			Soil 2019-105		
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	%	20	**48.0**	2.55		**36.5**	3.74		**50.3**	5.01		**41.7**	3.90		**50.7**	4.60	
pH - sp	Unit	29	**7.78**	0.110		**5.43**	0.070		**5.20**	0.100		**7.10**	0.100		**6.33**	0.070	
ECe - sp	dS/m	29	**0.810**	0.082		**0.780**	0.084		**0.380**	0.062		**3.28**	0.250		**0.400**	0.050	
HCO3 - sp	mmolc/L	11	**4.57**	0.768		**1.22**	0.119		**0.968**	0.238		**4.68**	0.745		**2.69**	0.400	
Ca - sp	mmolc/L	26	**3.41**	0.405		**3.15**	0.450		**1.98**	0.345		**21.6**	3.22		**3.03**	0.466	
Mg - sp	mmolc/L	27	**1.87**	0.210		**1.97**	0.274		**0.717**	0.127		**7.74**	1.04		**1.08**	0.170	
Na - sp	mmolc/L	27	**3.02**	0.450		**0.960**	0.160		**0.130**	0.010		**11.0**	1.09		**0.163**	0.016	
SAR - sp	value	20	**1.82**	0.090		**0.555**	0.055		**0.120**	0.030		**2.83**	0.120		**0.110**	0.010	
Cl - sp	mmolc/L	15	**1.81**	0.445		**0.590**	0.080		**0.226**	0.054		**2.96**	0.483		**0.200**	0.043	
SO4 - sp	mmolc/L	17	**1.30**	0.224		**1.91**	0.230		**0.430**	0.090		**29.4**	3.30		**0.950**	0.210	
NO_3 - sp	mmolc/L	9	**0.015**	0.003		**2.02**	0.356		**0.945**	0.190		**1.44**	0.150		**0.010**	0.002	
B - sp	mg/L	16	**0.100**	0.011		**0.712**	0.071		**0.075**	0.016		**0.728**	0.092		**0.070**	0.006	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	40	**0.400**	0.038		**0.264**	0.044		**0.192**	0.022		**1.27**	0.125		**0.213**	0.028	
Soil EC (1:2)	(dS/m)	48	**0.278**	0.028		**0.190**	0.017		**0.126**	0.018		**0.942**	0.160		**0.122**	0.018	
pH (1:1) Water	Unit	90	**8.10**	0.100		**5.60**	0.065		**5.28**	0.045		**7.34**	0.057		**6.50**	0.070	
pH (1:2) Water	Unit	30	**8.28**	0.126		**5.72**	0.070		**5.40**	0.080		**7.51**	0.075		**6.62**	0.080	
pH (1:1) 0.01M CaCl2	Unit	27	**7.66**	0.060		**5.15**	0.070		**4.77**	0.050		**7.15**	0.070		**6.02**	0.080	
pH (1:2) 0.01M CaCl2	Unit	13	**7.60**	0.100		**5.14**	0.060		**4.80**	0.070		**7.15**	0.150		**6.00**	0.060	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	27	**7.48**	0.060		**6.81**	0.070		**6.50**	0.090		**7.35**	0.050		**6.94**	0.040	
Adams-Evans Buf pH	Unit	7	**7.85**	0.080		**7.61**	0.075		**7.56**	0.080		**7.79**	0.060		**7.66**	0.060	
Woodruff Buf. pH	Unit	20	**7.12**	0.025		**6.68**	0.060		**6.46**	0.065		**7.06**	0.035		**6.80**	0.030	
Mehlich Buffer pH	Unit	8	**6.85**	0.065		**6.12**	0.050		**5.96**	0.060		**6.65**	0.025		**6.28**	0.020	
Sikora Buffer pH	Unit	29	**7.50**	0.030		**6.80**	0.070		**6.52**	0.065		**7.36**	0.040		**6.99**	0.060	
Titratable Acidity	cmol/kg	1	**0.000**	0.000		**0.103**	0.000		**0.123**	0.000		**0.000**	0.000		**0.000**	0.000	
Inorganic Nitrogen (NO3-N & NH4-N)																	
NO3-N Cd. Rd.	mg/kg	69	**2.60**	0.400		**15.2**	0.750		**15.2**	0.800		**31.8**	1.64		**2.53**	0.400	
NO3-N ISE	mg/kg	11	**5.00**	0.74		**15.9**	1.58		**15.1**	2.10		**33.4**	3.30		**4.30**	0.700	
NO3-N CTA	mg/kg	2	**2.40**	0.628		**14.2**	0.852		**14.8**	1.51		**27.1**	2.38		**3.02**	0.475	
NO3-N Ion Chr.	mg/kg	1	**2.69**	0.000		**15.1**	0.000		**16.0**	0.000		**31.9**	0.000		**2.71**	0.000	
NO3-N Other _____	mg/kg	8	**2.52**	0.500		**15.0**	1.03		**15.0**	1.76		**29.1**	1.78		**3.00**	0.185	
NH4 - N (KCl Extr.)	mg/kg	55	**2.25**	0.420		**7.05**	0.705		**5.60**	0.620		**5.28**	0.605		**29.4**	2.46	
Phosphorus and Sulfur																	
PO4-P Bray P (1:10)	mg/kg	48	**51.0**	4.60		**104**	6.90		**61.0**	4.43		**43.0**	3.31		**33.0**	2.42	
PO4-P Bray P1 (1:7)	mg/kg	8	**43.2**	8.98		**109**	17.0		**54.8**	7.20		**40.9**	6.76		**36.0**	5.50	
PO4-P Olsen/Bicarb	mg/kg	57	**24.7**	1.58		**55.5**	5.72		**34.1**	3.37		**21.0**	1.65		**18.4**	1.45	
PO4-P AB-DTPA	mg/kg	4	**11.1**	0.313		**28.7**	0.786		**15.6**	1.29		**11.0**	0.778		**12.4**	1.07	
PO4-P Modified Morgan	mg/kg	5	**36.0**	1.40		**11.9**	0.900		**5.00**	0.180		**20.3**	0.600		**4.09**	0.090	
PO4-P True Morgan	mg/kg	7	**33.2**	4.80		**14.8**	1.10		**5.60**	0.300		**21.0**	1.10		**5.80**	0.600	
PO4-P Mod. Kewlona	mg/kg	1	**47.0**	0.000		**75.0**	0.000		**50.0**	0.000		**38.0**	0.000		**24.0**	0.000	
PO4-P Stong Bray (1:10)	mg/kg	11	**319**	26.6		**286**	11.2		**80.8**	6.60		**144**	3.67		**55.9**	4.20	
PO4-P Water Soluble	mg/kg																
SO4 - S (PO4 Extr.)	mg/kg	34	**11.3**	1.78		**11.9**	1.74		**5.61**	0.76		**151**	28.0		**9.00**	1.65	

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Bases													
K Ammonium Acetate	mg/kg	78	**833**	65.5	**434**	19.5	**230**	14.5	**308**	18.7	**284**	11.5	
Ca Ammonium Acetate	mg/kg	74	**4,490**	483	**1,030**	59.6	**1,100**	63.0	**4,060**	379	**2,100**	102	
Mg Ammonium Acetate	mg/kg	74	**656**	35.7	**270**	15.0	**158**	10.5	**449**	25.6	**295**	15.3	
Na Ammonium Acetate	mg/kg	65	**143**	16.6	**26.3**	2.25	**10.0**	2.34	**250**	20.3	**11.6**	1.50	
Bray Extractable K	mg/kg	7	**505**	34.0	**366**	18.8	**181**	5.20	**216**	10.3	**215**	10.0	
K- Olsen/Bicarb.	mg/kg	5	**594**	8.00	**419**	13.0	**232**	13.0	**240**	13.0	**225**	3.00	
K Modified Morgan	mg/kg	4	**769**	61.0	**401**	14.0	**227**	12.0	**266**	14.0	**258**	17.5	
K True Morgan	mg/kg	5	**439**	7.00	**301**	15.0	**180**	12.0	**162**	12.0	**170**	10.0	
Ca Modified Morgan	mg/kg	4	**11,300**	461	**1,010**	118	**1,050**	89.5	**6,100**	634	**2,000**	118	
Aluminum KCL Extr.	mg/kg	4	**0.637**	0.290	**3.40**	1.20	**12.6**	1.60	**0.725**	0.300	**0.870**	0.348	
Mehlich-1 Multi Element (scoop)													
Scoop Soil Mass	g	4	**5.00**	0.000	**5.00**	0.000	**5.00**	0.000	**5.00**	0.000	**5.00**	0.000	
P	mg/kg	9	**34.1**	03.1	**227**	16.6	**32.5**	2.16	**69.0**	11.0	**31.3**	2.26	
K	mg/kg	9	**243**	28.1	**311**	18.4	**157**	6.29	**142**	19.2	**166**	8.64	
Ca	mg/kg	9	**5,650**	658	**1,260**	34.4	**886**	33.4	**5,160**	580	**1,840**	32.0	
Mg	mg/kg	9	**509**	24.5	**231**	7.28	**130**	7.50	**458**	23.8	**245**	5.42	
Mn	mg/kg	8	**1.78**	0.271	**56.3**	2.80	**81.6**	6.86	**39.4**	3.84	**120**	5.36	
Zn	mg/kg	8	**0.127**	0.019	**9.07**	0.452	**2.43**	0.075	**3.80**	0.700	**2.05**	0.091	
Mehlich-3 Mult-Element (scoop)													
Scoop Soil Mass	g	25	**1.96**	0.050	**2.20**	0.090	**1.87**	0.100	**2.20**	0.080	**2.00**	0.050	
Assumed Density	g/cm3	18	**1.01**	0.055	**1.12**	0.062	**0.945**	0.060	**1.15**	0.054	**1.01**	0.045	
Volume of Scoop	cm3	25	**2.00**	0.000	**2.00**	0.000	**2.00**	0.000	**2.00**	0.000	**2.00**	0.000	
Extractrant Volume mL	mL	20	**20.0**	0.000	**20.0**	0.000	**20.0**	0.000	**20.0**	0.000	**20.0**	0.000	
P Colorimetric	mg/kg	11	**67.2**	5.10	**124**	3.00	**64.5**	4.00	**50.9**	3.33	**37.6**	3.73	
P ICP-AES	mg/kg	49	**75.0**	2.71	**137**	8.50	**73.1**	4.81	**55.6**	3.36	**45.9**	2.56	
K	mg/kg	54	**823**	52.3	**449**	22.0	**219**	11.6	**314**	13.9	**280**	13.3	
Ca	mg/kg	51	**6,150**	423	**1,130**	79.0	**1,100**	71.7	**5,100**	278	**2,190**	149	
Mg	mg/kg	52	**784**	42.0	**298**	19.0	**160**	14.8	**548**	30.6	**316**	18.8	
Na	mg/kg	42	**132**	12.6	**27.4**	2.55	**10.1**	1.62	**259**	19.5	**13.5**	2.83	
S	mg/kg	45	**21.0**	1.65	**19.6**	1.65	**11.6**	1.36	**252**	13.5	**16.0**	1.95	
Al	mg/kg	34	**598**	31.1	**547**	47.3	**811**	58.2	**451**	38.5	**598**	43.7	
Zn	mg/kg	45	**6.03**	0.290	**11.8**	0.610	**3.46**	0.260	**7.30**	0.300	**2.90**	0.200	
Mn	mg/kg	44	**168**	11.8	**69.0**	4.24	**170**	11.8	**134**	9.35	**148**	7.16	
Fe	mg/kg	45	**55.2**	3.72	**256**	14.0	**244**	18.0	**96.6**	9.60	**284**	23.4	
Cu	mg/kg	45	**2.39**	0.110	**2.81**	0.170	**1.13**	0.090	**7.81**	0.510	**2.77**	0.180	
B	mg/kg	37	**1.87**	0.220	**0.890**	0.090	**0.440**	0.100	**3.05**	0.380	**0.710**	0.142	
Micronutrients													
Zn - DTPA	mg/kg	67	**2.44**	0.190	**6.70**	0.510	**2.21**	0.148	**2.90**	0.200	**1.79**	0.110	
Mn - DTPA	mg/kg	50	**5.00**	0.48	**43.8**	2.70	**75.5**	7.00	**24.4**	2.66	**120**	10.3	
Fe - DTPA	mg/kg	53	**11.2**	1.15	**78.1**	8.80	**88.8**	10.3	**16.2**	1.80	**100**	9.25	
Cu - DTPA	mg/kg	54	**0.830**	0.085	**2.90**	0.200	**0.950**	0.050	**3.67**	0.330	**2.12**	0.080	
Zn - HCl	mg/kg	3	**5.10**	0.800	**13.3**	0.090	**2.90**	0.030	**7.80**	0.850	**2.60**	0.000	
Mn-H3PO4	mg/kg	11	**1.61**	0.363	**42.2**	2.50	**67.4**	2.55	**30.8**	3.55	**97.0**	4.25	
Cl - Ca(NO3)2 Extr.	mg/kg	14	**31.5**	4.08	**8.22**	1.23	**3.10**	0.313	**50.5**	3.80	**3.59**	0.55	
B - Hot Wat.	mg/kg	30	**0.780**	0.093	**0.800**	0.120	**0.310**	0.060	**1.92**	0.213	**0.430**	0.070	
B-DTPA/Sorbitol	mg/kg	16	**1.02**	0.070	**0.500**	0.075	**0.200**	0.050	**2.36**	0.221	**0.327**	0.042	
Soil Organic Matter													
Soil Kjeldahl N	%	19	**0.119**	0.008	**0.083**	0.008	**0.149**	0.009	**0.099**	0.009	**0.147**	0.017	
Soil TN (combustion)	%	40	**0.126**	0.014	**0.090**	0.010	**0.162**	0.012	**0.102**	0.008	**0.160**	0.012	
Soil TOC (Combustion)	%	12	**1.18**	0.078	**0.854**	0.055	**1.57**	0.051	**0.968**	0.035	**1.69**	0.052	
Soil Total C (Combustion)	%	31	**1.61**	0.034	**0.850**	0.031	**1.60**	0.042	**1.11**	0.034	**1.72**	0.043	

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SOM - Walkley-Black	%	26	**1.92**	0.110	**1.60**	0.105	**2.71**	0.105	**1.72**	0.100	**2.89**	0.165
SOM - LOI (% Wt loss)	%	72	**3.12**	0.208	**1.80**	0.100	**3.26**	0.130	**2.17**	0.155	**3.12**	0.135
Other												
CaCO3 Content	%	15	**4.60**	0.800	**0.630**	0.155	**0.365**	0.063	**1.30**	0.145	**0.445**	0.081
CEC - Cation Displacement	cmol/kg	19	**25.2**	2.52	**11.7**	1.70	**15.0**	2.00	**19.0**	1.96	**19.0**	1.90
CEC - Estimation	cmol/kg	12	**32.2**	3.10	**11.3**	0.800	**11.3**	1.35	**26.7**	2.46	**14.3**	1.15
Soil Density (Scoop)	g/cc	11	**1.13**	0.020	**1.29**	0.030	**1.11**	0.043	**1.31**	0.024	**1.17**	0.030
Particle Size Analysis-Hydrometer												
Sand 2000 - 50 um	%	32	**38.0**	3.35	**50.0**	4.72	**12.5**	1.63	**40.8**	3.02	**15.9**	1.93
Silt 50 - 2 um	%	32	**40.0**	5.05	**40.0**	5.05	**69.5**	2.80	**36.5**	5.00	**64.7**	4.10
Clay 2 - 0 um	%	32	**23.2**	2.00	**10.0**	1.70	**18.0**	2.40	**22.2**	2.20	**19.7**	2.17
Particle Size Analysis- Pipette												
Sand 2000 - 50 um	%	3	**43.0**	2.00	**53.0**	3.00	**9.00**	5.00	**43.0**	0.000	**9.00**	0.000
Silt 50 - 2 um	%	3	**33.0**	1.00	**41.0**	1.00	**76.0**	2.00	**36.0**	0.000	**69.0**	4.00
Clay 2 - 0 um	%	3	**18.0**	1.00	**8.00**	2.00	**15.0**	0.000	**21.0**	2.00	**19.0**	1.00
Solvita CO2	ppm	5	**85.5**	5.46	**110**	8.15	**162**	17.7	**108**	62.0	**185**	30.0

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