2019 North American Proficiency Testing Program
Quarter 4 Soil Report - Wednesday, January 8, 2020

Laboratory ID
General

Soil			Soil 2019-116			Soil 2019-117			Soil 2019-118			Soil 2019-119			Soil 2019-120		
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	%	18	**52.2**	3.80		**50.4**	3.25		**47.4**	2.55		**21.9**	2.68		**42.0**	3.05	
pH - sp	Unit	26	**7.57**	0.055		**5.24**	0.120		**6.36**	0.090		**6.68**	0.110		**4.56**	0.085	
ECe - sp	dS/m	26	**2.88**	0.190		**0.370**	0.030		**0.414**	0.065		**0.840**	0.120		**0.532**	0.080	
HCO3 - sp	mmolc/L	10	**5.56**	0.55		**0.95**	0.130		**2.94**	0.581		**1.85**	0.325		**0.762**	0.136	
Ca - sp	mmolc/L	23	**9.45**	1.34		**1.99**	0.190		**2.91**	0.330		**3.67**	0.435		**2.33**	0.320	
Mg - sp	mmolc/L	23	**6.87**	0.670		**0.720**	0.088		**1.38**	0.120		**2.99**	0.290		**0.700**	0.100	
Na - sp	mmolc/L	23	**4.17**	0.350		**0.130**	0.015		**0.210**	0.050		**0.180**	0.014		**0.191**	0.027	
SAR - sp	value	18	**1.42**	0.115		**0.100**	0.020		**0.140**	0.030		**0.100**	0.020		**0.166**	0.035	
Cl - sp	mmolc/L	13	**3.40**	0.460		**0.230**	0.050		**0.250**	0.050		**0.200**	0.040		**0.140**	0.013	
SO4 - sp	mmolc/L	14	**3.24**	0.350		**0.460**	0.046		**0.770**	0.055		**0.580**	0.070		**0.308**	0.042	
NO_3 - sp	mmolc/L	8	**12.3**	2.70		**0.91**	0.148		**0.350**	0.073		**4.52**	0.85		**2.77**	0.49	
B - sp	mg/L	10	**0.370**	0.053		**0.057**	0.006		**0.161**	0.020		**0.033**	0.005		**0.057**	0.006	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	37	**1.25**	0.220		**0.190**	0.014		**0.279**	0.026		**0.200**	0.049		**0.210**	0.020	
Soil EC (1:2)	(dS/m)	39	**0.865**	0.075		**0.124**	0.013		**0.160**	0.020		**0.130**	0.020		**0.152**	0.015	
pH (1:1) Water	Unit	82	**7.74**	0.060		**5.30**	0.065		**6.50**	0.060		**6.82**	0.060		**4.71**	0.060	
pH (1:2) Water	Unit	27	**7.88**	0.120		**5.46**	0.071		**6.60**	0.070		**6.96**	0.080		**4.85**	0.060	
pH (1:1) 0.01M CaCl2	Unit	24	**7.50**	0.045		**4.81**	0.050		**6.06**	0.040		**6.40**	0.030		**4.22**	0.055	
pH (1:2) 0.01M CaCl2	Unit	12	**7.50**	0.085		**4.78**	0.045		**6.06**	0.040		**6.34**	0.060		**4.24**	0.033	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	23	**7.45**	0.060		**6.53**	0.060		**6.93**	0.070		**7.30**	0.080		**6.30**	0.120	
Adams-Evans Buf pH	Unit	8	**7.82**	0.045		**7.54**	0.085		**7.64**	0.080		**7.88**	0.025		**7.37**	0.080	
Woodruff Buf. pH	Unit	19	**7.18**	0.020		**6.47**	0.050		**6.80**	0.020		**6.94**	0.036		**6.24**	0.080	
Mehlich Buffer pH	Unit	6	**6.79**	0.035		**6.00**	0.040		**6.29**	0.020		**6.56**	0.040		**5.80**	0.030	
Sikora Buffer pH	Unit	31	**7.50**	0.030		**6.57**	0.068		**6.93**	0.045		**7.40**	0.040		**6.24**	0.090	
Titratable Acidity	cmol/kg																
Inorganic Nitrogen (NO3-N & NH4-N)																	
NO3-N Cd. Rd.	mg/kg	62	**123**	7.72		**14.1**	0.935		**10.4**	0.775		**20.4**	2.45		**26.0**	1.10	
NO3-N ISE	mg/kg	7	**112**	6.57		**14.9**	1.10		**11.0**	2.00		**22.0**	1.92		**27.1**	1.11	
NO3-N CTA	mg/kg																
NO3-N Ion Chr.	mg/kg	2	**134**	6.00		**15.6**	0.450		**11.6**	0.450		**17.8**	2.15		**27.0**	0.950	
NO3-N Other _____	mg/kg	5	**119**	2.80		**14.4**	1.80		**10.5**	0.580		**19.3**	1.70		**24.6**	1.90	
NH4 - N (KCl Extr.)	mg/kg	48	**4.99**	0.775		**6.54**	0.770		**17.4**	1.36		**2.71**	0.544		**6.90**	0.900	
Phosphorus and Sulfur																	
PO4-P Bray P (1:10)	mg/kg	44	**120**	17.4		**61.5**	2.45		**36.2**	2.75		**88.5**	10.6		**76.6**	4.30	
PO4-P Bray P1 (1:7)	mg/kg	7	**108**	15.3		**51.4**	4.67		**29.3**	5.69		**63.8**	7.48		**64.2**	7.88	
PO4-P Olsen/Bicarb	mg/kg	49	**127**	11.1		**34.0**	2.37		**24.4**	1.45		**22.6**	4.05		**44.8**	3.72	
PO4-P AB-DTPA	mg/kg	2	**97.2**	20.4		**19.0**	5.48		**19.8**	4.91		**18.4**	4.79		**21.5**	6.55	
PO4-P Modified Morgan	mg/kg	4	**158**	7.50		**4.76**	0.850		**9.90**	0.500		**11.1**	1.25		**5.32**	0.835	
PO4-P True Morgan	mg/kg	7	**160**	12.5		**5.70**	0.500		**11.6**	0.500		**12.9**	0.650		**6.30**	0.210	
PO4-P Mod. Kewlona	mg/kg	2	**170**	9.50		**49.7**	6.00		**28.7**	4.90		**62.8**	8.15		**63.4**	4.95	
PO4-P Stong Bray (1:10)	mg/kg	11	**286**	9.20		**82.3**	3.50		**84.0**	4.40		**110**	9.00		**94.0**	3.70	
PO4-P Water Soluble	mg/kg																
SO4 - S (PO4 Extr.)	mg/kg	26	**30.0**	3.18		**5.56**	1.34		**5.59**	0.900		**3.29**	0.705		**8.31**	1.17	

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Bases												
K Ammonium Acetate	mg/kg	66	**2,680**	202	**229**	12.2	**261**	12.4	**140**	18.5	**304**	11.4
Ca Ammonium Acetate	mg/kg	60	**3,900**	428	**1,100**	59.6	**2,590**	132	**481**	76.4	**741**	39.5
Mg Ammonium Acetate	mg/kg	60	**746**	33.7	**155**	9.37	**418**	15.4	**120**	17.2	**90.2**	5.75
Na Ammonium Acetate	mg/kg	49	**135**	12.9	**9.99**	2.49	**16.3**	2.60	**7.06**	0.81	**9.48**	2.18
Bray Extractable K	mg/kg	6	**1,930**	137	**184**	5.00	**201**	8.20	**146**	9.50	**251**	6.31
K- Olsen/Bicarb.	mg/kg	4	**2,120**	30.0	**226**	12.5	**217**	11.5	**120**	9.50	**291**	13.5
K Modified Morgan	mg/kg	3	**2,510**	5.00	**229**	13.0	**240**	16.0	**107**	8.00	**300**	9.00
K True Morgan	mg/kg	5	**1,760**	45.0	**179**	10.0	**168**	11.0	**102**	4.40	**247**	7.00
Ca Modified Morgan	mg/kg	2	**10,300**	5,120	**1,220**	153	**2,500**	162	**342**	75.0	**752**	82.5
Aluminum KCL Extr.	mg/kg	4	**0.433**	0.117	**7.40**	1.60	**0.480**	0.020	**0.700**	0.392	**79.2**	12.8
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	**114**	2.53	**31.7**	4.59	**58.0**	6.55	**51.6**	8.62	**34.7**	4.36
K	mg/kg	9	**1,170**	102	**156**	7.81	**162**	12.3	**136**	16.5	**226**	10.9
Ca	mg/kg	9	**4,810**	651	**916**	30.7	**2,600**	217	**621**	69.5	**632**	30.4
Mg	mg/kg	9	**628**	39.3	**133**	2.95	**407**	30.2	**145**	11.9	**81.5**	5.10
Mn	mg/kg	7	**5.62**	0.520	**98.4**	0.950	**180**	9.92	**37.2**	6.31	**98.6**	8.02
Zn	mg/kg	7	**0.130**	0.077	**2.44**	0.070	**3.21**	0.319	**2.21**	0.150	**1.74**	0.050
Mehlich-3 Mult-Element (scoop)												
Scoop Soil Mass	g	25	**2.05**	0.060	**1.86**	0.081	**2.10**	0.065	**2.76**	0.080	**2.05**	0.090
Assumed Density	g/cm3	19	**1.03**	0.050	**0.925**	0.065	**1.06**	0.040	**1.39**	0.060	**1.06**	0.085
Volume of Scoop	cm3	24	**2.00**	0.000	**2.00**	0.000	**2.00**	0.000	**2.00**	0.000	**2.00**	0.000
Extractrant Volume mL	mL	19	**20.0**	0.000	**20.0**	0.000	**20.0**	0.000	**20.0**	0.000	**20.0**	0.000
P Colorimetric	mg/kg	10	**220**	7.85	**66.4**	2.20	**40.2**	1.95	**91.5**	3.51	**80.8**	2.16
P ICP-AES	mg/kg	51	**240**	8.24	**71.2**	3.03	**46.6**	2.69	**104**	6.50	**85.8**	4.60
K	mg/kg	53	**2,690**	150	**224**	9.91	**265**	12.2	**164**	9.50	**316**	13.6
Ca	mg/kg	50	**5,300**	302	**1,090**	46.5	**2,850**	107	**599**	43.1	**751**	48.8
Mg	mg/kg	50	**931**	45.1	**162**	8.73	**454**	29.6	**152**	12.2	**97.6**	8.15
Na	mg/kg	42	**139**	11.3	**11.0**	1.91	**17.9**	2.83	**9.26**	2.12	**12.2**	1.86
S	mg/kg	44	**50.1**	2.25	**11.5**	0.780	**12.0**	1.10	**7.90**	1.00	**14.6**	1.02
Al	mg/kg	31	**260**	28.0	**800**	45.0	**412**	21.2	**559**	46.2	**925**	34.8
Zn	mg/kg	46	**6.25**	0.430	**3.19**	0.170	**4.22**	0.299	**2.98**	0.212	**2.26**	0.185
Mn	mg/kg	45	**112**	7.82	**175**	7.58	**300**	21.3	**125**	13.7	**167**	6.86
Fe	mg/kg	45	**55.2**	5.21	**237**	12.8	**210**	12.0	**147**	12.3	**197**	9.16
Cu	mg/kg	45	**1.90**	0.130	**1.10**	0.070	**2.13**	0.090	**1.48**	0.120	**0.930**	0.070
B	mg/kg	37	**5.24**	0.380	**0.380**	0.039	**1.24**	0.110	**0.250**	0.054	**0.236**	0.025
Micronutrients												
Zn - DTPA	mg/kg	61	**2.16**	0.140	**2.18**	0.097	**2.50**	0.147	**0.865**	0.170	**1.56**	0.092
Mn - DTPA	mg/kg	46	**10.6**	1.09	**96.8**	9.20	**150**	16.1	**12.1**	1.48	**102**	7.47
Fe - DTPA	mg/kg	48	**9.30**	1.25	**86.5**	9.78	**72.4**	10.4	**10.9**	2.28	**74.7**	8.78
Cu - DTPA	mg/kg	49	**0.750**	0.080	**0.941**	0.059	**1.24**	0.125	**0.500**	0.100	**0.836**	0.066
Zn - HCl	mg/kg	2	**3.08**	2.94	**3.25**	0.050	**4.62**	0.360	**3.22**	0.175	**2.40**	0.030
Mn-H3PO4	mg/kg	10	**6.64**	1.50	**82.4**	8.48	**128**	10.2	**27.7**	2.81	**85.0**	5.55
Cl - Ca(NO3)2 Extr.	mg/kg	13	**60.0**	8.00	**3.55**	0.24	**3.35**	0.258	**1.66**	0.188	**2.11**	0.210
B - Hot Wat.	mg/kg	25	**2.46**	0.290	**0.320**	0.060	**0.802**	0.155	**0.130**	0.022	**0.250**	0.047
B-DTPA/Sorbitol	mg/kg	19	**2.78**	0.180	**0.215**	0.016	**0.546**	0.065	**0.081**	0.015	**0.135**	0.017
Soil Organic Matter												
Soil Kjeldahl N	%	10	**0.290**	0.005	**0.158**	0.004	**0.196**	0.004	**0.038**	0.002	**0.110**	0.006
Soil TN (combustion)	%	36	**0.310**	0.014	**0.160**	0.010	**0.210**	0.011	**0.040**	0.003	**0.120**	0.010
Soil TOC (Combustion)	%	11	**3.31**	0.346	**1.59**	0.070	**2.33**	0.148	**0.406**	0.042	**1.12**	0.020
Soil Total C (Combustion)	%	29	**4.03**	0.113	**1.61**	0.042	**2.30**	0.093	**0.410**	0.035	**1.12**	0.030

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SOM - Walkley-Black	%	23	**5.00**	0.250	**2.88**	0.150	**3.86**	0.165	**0.800**	0.115	**1.96**	0.140
SOM - LOI (% Wt loss)	%	63	**5.30**	0.200	**3.30**	0.110	**3.90**	0.160	**0.800**	0.050	**2.61**	0.090
Other												
CaCO3 Content	%	8	**8.48**	0.325	**0.300**	0.110	**0.340**	0.260	**0.320**	0.180	**0.300**	0.100
CEC - Cation Displacement	cmol/kg	9	**25.4**	3.45	**12.2**	1.43	**20.8**	3.96	**3.50**	0.430	**11.3**	1.66
CEC - Estimation	cmol/kg	12	**34.9**	3.87	**10.0**	1.30	**18.1**	0.940	**4.25**	0.650	**11.5**	1.50
Soil Density (Scoop)	g/cc	10	**1.18**	0.010	**1.08**	0.035	**1.22**	0.020	**1.61**	0.020	**1.19**	0.038
Particle Size Analysis-Hydrometer												
Sand 2000 - 50 um	%	32	**48.2**	3.37	**11.8**	1.82	**61.0**	1.70	**88.6**	1.55	**20.6**	3.65
Silt 50 - 2 um	%	32	**34.0**	4.00	**70.0**	3.10	**20.8**	2.00	**6.00**	0.55	**61.0**	4.85
Clay 2 - 0 um	%	32	**18.4**	3.28	**17.6**	2.50	**18.0**	1.95	**4.30**	0.980	**18.5**	1.96
Particle Size Analysis- Pipette												
Sand 2000 - 50 um	%	3	**48.8**	0.800	**5.10**	2.10	**59.0**	2.00	**89.0**	0.600	**16.0**	2.00
Silt 50 - 2 um	%	3	**36.0**	0.200	**77.0**	2.80	**23.1**	1.90	**7.00**	0.300	**65.0**	2.00
Clay 2 - 0 um	%	3	**15.0**	1.00	**15.2**	2.20	**16.9**	0.900	**4.00**	0.900	**16.3**	2.70
Solvita CO2	ppm	5	**107**	45.0	**104**	33.3	**122**	53.0	**14.0**	9.00	**61.0**	27.2

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