2022 North American Proficiency Testing Program

Quarter 1 Soil Report - Wednesday, April 20, 2022

Laboratory ID

General

Soil			Soil 2022-101			Soil 2022-102			Soil 2022-103			Soil 2022-104			Soil 2022-105		
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	**47.9**	*4.79*		**25.6**	*3.50*		**24.3**	*2.55*		**52.9**	*6.10*		**51.0**	*4.26*	
pH - sp	Unit	30	**6.52**	*0.090*		**6.86**	*0.070*		**6.60**	*0.075*		**7.60**	*0.085*		**5.90**	*0.050*	
ECe - sp	dS/m	28	**0.832**	*0.120*		**0.995**	*0.160*		**0.853**	*0.115*		**2.66**	*0.515*		**0.400**	*0.050*	
HCO3 - sp	mmolc/L	12	**1.34**	*0.144*		**2.46**	*0.575*		**1.79**	*0.430*		**10.7**	*1.47*		**1.99**	*0.292*	
Ca - sp	mmolc/L	24	**6.14**	*0.864*		**4.25**	*0.655*		**3.46**	*0.444*		**9.36**	*0.860*		**2.67**	*0.405*	
Mg - sp	mmolc/L	24	**0.925**	*0.124*		**2.13**	*0.345*		**2.72**	*0.350*		**6.62**	*0.766*		**1.05**	*0.184*	
Na - sp	mmolc/L	24	**0.200**	*0.035*		**0.720**	*0.156*		**0.142**	*0.019*		**4.14**	*0.542*		**0.130**	*0.011*	
SAR - sp	value	16	**0.115**	*0.025*		**0.390**	*0.030*		**0.100**	*0.011*		**1.46**	*0.155*		**0.105**	*0.010*	
Cl - sp	mmolc/L	17	**0.214**	*0.025*		**0.520**	*0.071*		**0.280**	*0.032*		**3.12**	*0.620*		**0.555**	*0.076*	
SO4 - sp	mmolc/L	18	**0.426**	*0.056*		**2.88**	*0.565*		**0.905**	*0.159*		**3.10**	*0.600*		**1.03**	*0.162*	
NO_3 - sp	mmolc/L	12	**5.59**	*1.33*		**3.08**	*0.736*		**4.38**	*0.978*		**10.8**	*1.14*		**0.225**	*0.050*	
B - sp	mg/L	9	**0.100**	*0.016*		**0.310**	*0.050*		**0.130**	*0.028*		**0.386**	*0.040*		**0.095**	*0.009*	
Soil pH & EC																	
Soil EC (1:1)	(dS/m)	36	**0.400**	*0.039*		**0.291**	*0.034*		**0.235**	*0.047*		**1.25**	*0.110*		**0.260**	*0.032*	
Soil EC (1:2)	(dS/m)	41	**0.257**	*0.020*		**0.200**	*0.030*		**0.166**	*0.023*		**0.909**	*0.085*		**0.165**	*0.025*	
pH (1:1) Water	Unit	81	**6.60**	*0.088*		**7.06**	*0.060*		**6.76**	*0.040*		**7.70**	*0.067*		**6.09**	*0.060*	
pH (1:2) Water	Unit	26	**6.76**	*0.140*		**7.22**	*0.110*		**6.90**	*0.100*		**7.88**	*0.130*		**6.22**	*0.125*	
pH (1:1) 0.01M CaCl2	Unit	24	**6.30**	*0.045*		**6.60**	*0.045*		**6.30**	*0.025*		**7.50**	*0.045*		**5.60**	*0.040*	
pH (1:2) 0.01M CaCl2	Unit	12	**6.25**	*0.060*		**6.55**	*0.090*		**6.28**	*0.073*		**7.42**	*0.080*		**5.59**	*0.030*	
Buffer pH, Lime Req.																	
SMP Buffer pH	Unit	28	**7.12**	*0.085*		**7.31**	*0.060*		**7.15**	*0.070*		**7.45**	*0.050*		**6.72**	*0.084*	
Adams-Evans Buf pH	Unit	9	**7.67**	*0.080*		**7.83**	*0.020*		**7.76**	*0.040*		**7.80**	*0.050*		**7.54**	*0.110*	
Woodruff Buf. pH	Unit	21	**6.91**	*0.030*		**6.99**	*0.030*		**6.91**	*0.040*		**7.20**	*0.020*		**6.63**	*0.060*	
Mehlich Buffer pH	Unit	8	**6.40**	*0.035*		**6.55**	*0.090*		**6.48**	*0.055*		**6.75**	*0.010*		**6.12**	*0.055*	
Sikora Buffer pH	Unit	30	**7.15**	*0.050*		**7.36**	*0.045*		**7.22**	*0.025*		**7.49**	*0.040*		**6.74**	*0.060*	
Titratable Acidity	cmol/kg																
Inorganic Nitrogen (NO3-N & NH4-N)																	
NO3-N Cd. Rd.	mg/kg	60	**42.2**	*2.05*		**17.7**	*1.70*		**20.6**	*2.15*		**123**	*8.35*		**6.50**	*0.780*	
NO3-N ISE	mg/kg	7	**44.0**	*6.90*		**16.1**	*6.14*		**20.4**	*4.56*		**123**	*20.7*		**6.63**	*1.14*	
NO3-N CTA	mg/kg	2	**45.2**	*3.05*		**18.0**	*1.85*		**21.0**	*2.40*		**130**	*5.00*		**8.26**	*1.48*	
NO3-N Ion Chr.	mg/kg																
NO3-N Other _____	mg/kg	16	**41.7**	*5.38*		**18.2**	*3.48*		**22.2**	*4.01*		**117**	*13.5*		**7.00**	*0.96*	
NH4 - N (KCl Extr.)	mg/kg	49	**3.40**	*0.500*		**42.5**	*4.06*		**22.6**	*2.08*		**6.57**	*0.570*		**55.9**	*5.66*	
Phosphorus and Sulfur																	
PO4-P Bray P (1:10)	mg/kg	43	**28.2**	*1.34*		**100**	*9.95*		**72.0**	*5.20*		**106**	*16.0*		**39.0**	*3.00*	
PO4-P Bray P1 (1:7)	mg/kg	8	**23.3**	*1.30*		**72.1**	*4.95*		**56.0**	*5.28*		**89.6**	*17.6*		**29.7**	*2.12*	
PO4-P Olsen/Bicarb	mg/kg	51	**20.0**	*2.22*		**41.0**	*4.54*		**30.4**	*3.68*		**123**	*9.00*		**24.8**	*3.00*	
PO4-P AB-DTPA	mg/kg	2	**11.1**	*2.44*		**39.3**	*5.86*		**21.4**	*3.86*		**34.8**	*8.47*		**12.2**	*2.68*	
PO4-P Modified Morgan	mg/kg	3	**3.00**	*1.60*		**17.0**	*6.60*		**5.50**	*3.10*		**147**	*41.5*		**3.00**	*1.40*	
PO4-P True Morgan	mg/kg	8	**5.35**	*0.750*		**25.8**	*2.35*		**9.65**	*1.20*		**154**	*37.4*		**5.35**	*1.11*	
PO4-P Mod. Kewlona	mg/kg	2	**19.1**	*0.855*		**55.2**	*5.15*		**45.7**	*1.30*		**158**	*22.0*		**19.0**	*0.000*	
PO4-P Stong Bray (1:10)	mg/kg	10	**60.4**	*3.55*		**159**	*17.9*		**122**	*8.45*		**276**	*11.0*		**77.5**	*1.88*	
PO4-P Water Soluble	mg/kg																
SO4 - S (PO4 Extr.)	mg/kg	26	**4.39**	*0.780*		**13.8**	*1.65*		**5.98**	*1.12*		**31.1**	*2.94*		**8.82**	*0.840*	
Bases																	
K Ammonium Acetate	mg/kg	70	**248**	*9.50*		**247**	*19.6*		**219**	*21.0*		**2,760**	*192*		**243**	*17.0*	
Ca Ammonium Acetate	mg/kg	65	**2,080**	*117*		**858**	*88.0*		**760**	*90.0*		**3,890**	*492*		**2,650**	*159*	
Mg Ammonium Acetate	mg/kg	66	**131**	*7.59*		**146**	*13.5*		**204**	*19.9*		**734**	*31.9*		**410**	*24.9*	
Na Ammonium Acetate	mg/kg	52	**11.7**	*2.48*		**15.7**	*2.65*		**8.05**	*1.61*		**132**	*11.3*		**11.6**	*2.27*	
Bray Extractable K	mg/kg	5	**202**	*4.30*		**228**	*7.00*		**205**	*2.00*		**1,620**	*250*		**169**	*17.0*	

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K- Olsen/Bicarb.	mg/kg	4	**220**	*0.500*	**218**	*6.00*	**187**	*1.50*	**2,200**	*40.0*	**196**	*3.50*
K Modified Morgan	mg/kg	3	**252**	*7.22*	**231**	*13.8*	**198**	*20.1*	**2,320**	*42.0*	**244**	*7.79*
K True Morgan	mg/kg	6	**170**	*1.00*	**188**	*10.0*	**161**	*4.00*	**1,900**	*130*	**152**	*7.30*
Ca Modified Morgan	mg/kg	3	**2,350**	*40.4*	**844**	*184*	**738**	*152*	**15,000**	*1,760*	**2,880**	*27.0*
Aluminum KCL Extr.	mg/kg	4	**0.476**	*0.196*	**0.600**	*0.330*	**0.516**	*0.184*	**0.394**	*0.125*	**0.467**	*0.257*
Mehlich-1 Multi Element (scoop)												
Scoop Soil Mass	g	6	**5.00**	*0.000*	**5.00**	*0.000*	**5.00**	*0.000*	**5.00**	*0.000*	**5.00**	*0.000*
P	mg/kg	10	**31.3**	*1.90*	**71.8**	*5.01*	**42.3**	*2.94*	**117**	*7.08*	**20.5**	*1.70*
K	mg/kg	10	**166**	*10.3*	**197**	*10.1*	**182**	*9.18*	**1,230**	*86.6*	**144**	*12.8*
Ca	mg/kg	10	**1,880**	*78.3*	**935**	*21.7*	**879**	*50.6*	**5,080**	*575*	**2,260**	*127*
Mg	mg/kg	10	**115**	*3.93*	**148**	*3.89*	**223**	*10.8*	**629**	*67.0*	**322**	*24.6*
Mn	mg/kg	7	**32.6**	*1.61*	**148**	*11.2*	**120**	*2.20*	**7.44**	*0.391*	**129**	*3.54*
Zn	mg/kg	7	**2.48**	*0.142*	**31.1**	*0.820*	**3.40**	*0.151*	**0.080**	*0.020*	**1.72**	*0.127*
Mehlich-3 Mult-Element (scoop)												
Scoop Soil Mass	g	28	**2.12**	*0.110*	**2.40**	*0.100*	**2.47**	*0.080*	**2.04**	*0.071*	**1.91**	*0.092*
Assumed Density	g/cm3	20	**1.05**	*0.051*	**1.19**	*0.036*	**1.22**	*0.035*	**1.02**	*0.038*	**0.956**	*0.052*
Volume of Scoop	cm3	27	**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	12	**34.6**	*1.50*	**113**	*3.92*	**95.5**	*4.00*	**221**	*10.7*	**53.0**	*3.74*
P ICP-AES	mg/kg	55	**36.1**	*2.30*	**119**	*7.54*	**100**	*7.48*	**244**	*9.97*	**54.2**	*3.60*
K	mg/kg	55	**257**	*12.0*	**268**	*18.3*	**243**	*13.2*	**2,650**	*196*	**234**	*17.4*
Ca	mg/kg	54	**2,220**	*144*	**1,010**	*73.6*	**923**	*57.8*	**5,240**	*356*	**2,770**	*138*
Mg	mg/kg	54	**145**	*8.65*	**175**	*11.2*	**251**	*15.2*	**905**	*57.4*	**406**	*21.1*
Na	mg/kg	44	**12.2**	*1.85*	**17.3**	*1.67*	**9.58**	*1.53*	**134**	*9.80*	**11.7**	*1.69*
S	mg/kg	45	**9.00**	*1.04*	**20.7**	*1.20*	**12.5**	*1.06*	**51.1**	*3.22*	**15.4**	*1.40*
Al	mg/kg	31	**679**	*44.9*	**323**	*22.1*	**817**	*52.0*	**263**	*21.0*	**601**	*31.7*
Zn	mg/kg	50	**3.24**	*0.211*	**35.2**	*2.53*	**3.56**	*0.202*	**6.14**	*0.325*	**2.18**	*0.178*
Mn	mg/kg	49	**135**	*16.5*	**158**	*8.80*	**120**	*7.80*	**124**	*9.50*	**151**	*8.09*
Fe	mg/kg	49	**211**	*16.9*	**381**	*33.4*	**388**	*34.2*	**54.4**	*4.18*	**433**	*40.3*
Cu	mg/kg	49	**4.40**	*0.300*	**8.67**	*0.950*	**1.15**	*0.140*	**1.90**	*0.170*	**2.40**	*0.392*
B	mg/kg	42	**0.590**	*0.095*	**0.900**	*0.140*	**0.665**	*0.145*	**5.20**	*0.346*	**0.771**	*0.186*
Micronutrients												
Zn - DTPA	mg/kg	61	**1.96**	*0.140*	**17.7**	*2.00*	**1.61**	*0.190*	**2.30**	*0.240*	**1.52**	*0.180*
Mn - DTPA	mg/kg	49	**14.7**	*1.48*	**91.8**	*10.2*	**65.6**	*6.15*	**19.9**	*3.18*	**154**	*11.8*
Fe - DTPA	mg/kg	53	**37.4**	*5.25*	**77.2**	*12.9*	**90.9**	*16.1*	**8.80**	*1.58*	**205**	*26.5*
Cu - DTPA	mg/kg	53	**2.44**	*0.164*	**6.16**	*0.740*	**0.760**	*0.095*	**0.800**	*0.078*	**2.70**	*0.296*
Zn - HCl	mg/kg	2	**3.30**	*0.400*	**37.1**	*1.28*	**3.72**	*0.025*	**6.83**	*0.000*	**2.33**	*0.025*
Mn-H3PO4	mg/kg	9	**23.9**	*2.50*	**107**	*9.40*	**85.0**	*8.00*	**11.7**	*0.79*	**104**	*8.00*
Cl - Ca(NO3)2 Extr.	mg/kg	14	**4.34**	*0.59*	**5.17**	*0.61*	**4.15**	*0.55*	**60.7**	*4.32*	**9.90**	*1.40*
B - Hot Wat.	mg/kg	22	**0.300**	*0.043*	**0.538**	*0.122*	**0.300**	*0.048*	**2.40**	*0.385*	**0.430**	*0.075*
B-DTPA/Sorbitol	mg/kg	20	**0.253**	*0.046*	**0.453**	*0.050*	**0.297**	*0.047*	**2.79**	*0.260*	**0.390**	*0.090*
Soil Organic Matter												
Soil Kjeldahl N	%	13	**0.107**	*0.007*	**0.070**	*0.008*	**0.065**	*0.007*	**0.302**	*0.027*	**0.180**	*0.015*
Soil TN (combustion)	%	38	**0.112**	*0.011*	**0.067**	*0.007*	**0.068**	*0.008*	**0.308**	*0.012*	**0.187**	*0.013*
Soil TOC (Combustion)	%	16	**0.890**	*0.035*	**0.578**	*0.023*	**0.657**	*0.033*	**3.08**	*0.215*	**2.24**	*0.059*
Soil Total C (Combustion)	%	36	**0.920**	*0.030*	**0.600**	*0.030*	**0.690**	*0.036*	**3.92**	*0.137*	**2.25**	*0.074*
SOM - Walkley-Black	%	25	**1.50**	*0.100*	**1.10**	*0.130*	**1.20**	*0.100*	**5.20**	*0.293*	**3.82**	*0.180*
SOM - LOI (% Wt loss)	%	68	**2.00**	*0.100*	**1.21**	*0.070*	**1.38**	*0.075*	**5.25**	*0.185*	**4.24**	*0.162*
Other												
CaCO3 Content	%	12	**0.510**	*0.078*	**0.530**	*0.057*	**0.526**	*0.083*	**8.46**	*0.595*	**0.600**	*0.067*
CEC - Cation Displacement	cmol/kg	14	**14.0**	*1.58*	**6.75**	*1.12*	**7.05**	*1.25*	**25.4**	*2.20*	**23.4**	*3.42*
CEC - Estimation	cmol/kg	12	**13.4**	*1.44*	**7.02**	*0.900*	**7.19**	*0.900*	**35.7**	*4.30*	**21.8**	*1.60*
Soil Density (Scoop)	g/cc	10	**1.25**	*0.015*	**1.44**	*0.040*	**1.50**	*0.040*	**1.20**	*0.026*	**1.13**	*0.040*
Particle Size Analysis-Hydrometer												
Sand 2000 - 50 um	%	29	**13.1**	*1.53*	**58.1**	*3.10*	**69.2**	*2.10*	**47.3**	*3.70*	**12.0**	*2.70*
Silt 50 - 2 um	%	29	**65.0**	*3.70*	**30.0**	*2.70*	**20.0**	*1.40*	**34.2**	*3.00*	**60.7**	*3.58*

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Clay 2 - 0 um	%	29	**22.0**	*3.00*	**13.6**	*2.43*	**10.8**	*1.80*	**19.6**	*3.62*	**26.9**	*2.90*
Particle Size Analysis- Pipette												
Sand 2000 - 50 um	%	7	**10.0**	*5.52*	**59.2**	*1.20*	**68.9**	*1.86*	**48.0**	*2.60*	**7.82**	*5.82*
Silt 50 - 2 um	%	7	**66.0**	*5.78*	**29.0**	*0.600*	**22.0**	*1.00*	**32.2**	*5.96*	**65.0**	*6.80*
Clay 2 - 0 um	%	7	**22.6**	*0.600*	**11.0**	*1.80*	**10.2**	*1.00*	**20.4**	*8.40*	**27.0**	*1.50*
Soil Health												
Autoclave-Citrate Extractable (ACE) protein	mg/kg	1	**1.94**	*0.000*	**3.10**	*0.000*	**2.23**	*0.000*	**7.29**	*0.000*	**6.34**	*0.000*
Microbial CO2 respiration (1 day incubation-STCM)	mg/kg	5	**0.055**	*0.020*	**0.035**	*0.014*	**0.035**	*0.005*	**0.13**	*0.050*	**0.12**	*0.005*
Microbial CO2 respiration (4 day incubation-STCM)	mg/kg											
Microbial enzyme activity - As	mg PNP/kg soil h											
Microbial enzyme activity - Beta Glucosidase (BG)	mg PNP/kg soil h	1	**13.0**	*0.000*	**10.3**	*0.000*	**10.4**	*0.000*	**85.5**	*0.00*	**29.9**	*0.00*
Microbial enzyme activity - NAG	mg PNP/kg soil h	1	**3.58**	*0.000*	**3.52**	*0.000*	**2.85**	*0.000*	**25.3**	*0.00*	**12.5**	*0.00*
Microbial enzyme activity - Pase	mg PNP/kg soil h											
PMN 7 day anaerobic	mg/kg	1	**11.0**	*0.000*	**3.00**	*0.000*	**6.00**	*0.000*	**89.0**	*0.00*	**074**	*00.0*
Reactive carbon - permanganate oxidizable (POxC)	mg/kg	*2*	*419*	*158*	*408*	*189*	*425*	*213*	*884*	*195*	*604*	*198*

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