



2022 North American Proficiency Testing Program

Quarter 3 Soil Report - 10/24/2022

Laboratory ID

General

Soil	Soil 2022-111			Soil 2022-112			Soil 2022-113			Soil 2022-114			Soil 2022-115				
Analysis	Units	n	Median	MAD	Lab Result	Median	MAD	Lab Result	Median	MAD	Lab Result	Median	MAD	Lab Result	Median	MAD	Lab Result
Saturated Paste																	
Moisture - sp	%	16	53.6	5.45		24.3	3.31		44.5	4.00		47.5	0.950		65.8	7.73	
pH - sp	Unit	25	6.88	0.14		6.86	0.14		5.88	0.19		7.32	0.15		6.86	0.14	
ECe - sp	dS/m	26	0.74	0.075		0.88	0.11		0.75	0.15		0.31	0.033		1.29	0.14	
HCO3 - sp	mmolc/L	12	5.46	0.59		2.60	0.85		1.14	0.33		3.30	0.32		4.48	0.52	
Ca - sp	mmolc/L	23	5.89	0.79		4.57	1.08		4.91	0.93		2.20	0.47		7.84	1.01	
Mg - sp	mmolc/L	22	1.36	0.11		2.16	0.50		2.02	0.33		1.30	0.21		2.09	0.15	
Na - sp	mmolc/L	19	1.16	0.12		0.67	0.14		0.26	0.035		0.15	0.020		0.13	0.020	
SAR - sp	value	15	0.61	0.040		0.36	0.040		0.13	0.020		0.11	0.020		0.060	0.020	
Cl - sp	mmolc/L	16	1.00	0.17		0.42	0.080		1.07	0.12		0.23	0.079		3.93	0.47	
SO4 - sp	mmolc/L	14	1.08	0.18		2.86	0.85		0.70	0.16		0.26	0.030		1.71	0.43	
NO3 - sp	mmolc/L	6	0.25	0.23		2.85	1.22		3.71	1.30		0.18	0.14		1.44	1.15	
B - sp	mg/L	10	0.059	0.020		0.26	0.060		0.060	0.020		0.055	0.020		0.062	0.020	
pH & EC (1:1 or 1:2)																	
EC (1:1)	(dS/m)	33	0.37	0.050		0.28	0.023		0.37	0.020		0.19	0.030		0.58	0.068	
EC (1:2)	(dS/m)	39	0.25	0.037		0.20	0.033		0.25	0.027		0.11	0.020		0.52	0.095	
pH (1:1) Water	Unit	76	6.98	0.14		7.03	0.14		5.90	0.12		7.50	0.15		6.99	0.14	
pH (1:2) Water	Unit	21	7.10	0.14		7.16	0.14		6.08	0.12		7.60	0.15		7.16	0.14	
pH (1:1) 0.01M CaCl2	Unit	19	6.62	0.13		6.58	0.13		5.56	0.11		7.00	0.14		6.69	0.13	
pH (1:2) 0.01M CaCl2	Unit	12	6.67	0.13		6.59	0.13		5.60	0.11		6.82	0.14		6.72	0.13	
Lime Req.																	
SMP Buffer pH	Unit	24	7.10	0.14		7.31	0.15		7.00	0.14		7.28	0.15		7.03	0.14	
Adams-Evans Buf pH	Unit	7	7.63	0.15		7.83	0.157		7.65	0.15		7.72	0.15		7.62	0.15	
Woodruff Buf. pH	Unit	14	6.94	0.14		7.00	0.140		6.77	0.14		7.04	0.141		6.95	0.14	
Mehlich Buffer pH	Unit	7	6.47	0.129		6.50	0.130		6.27	0.13		6.59	0.132		6.52	0.130	
Sikora Buffer pH	Unit	30	7.12	0.14		7.34	0.15		6.99	0.14		7.30	0.15		7.10	0.14	
Titrateable Acidity	cmol/kg																
Inorganic Nitrogen (NO3-N & NH4-N)																	
NO3-N Cd. Rd.	mg/kg	54	12.0	0.35		17.2	1.35		38.1	1.75		2.95	0.35		34.9	3.71	
NO3-N ISE	mg/kg	7	12.5	3.43		18.2	2.95		43.3	5.59		7.00	3.00		44.6	14.2	
NO3-N CTA	mg/kg																
NO3-N Ion Chr.	mg/kg																
NO3-N Other	mg/kg	13	11.7	1.27		17.4	1.30		38.4	1.31		3.00	1.37		36.0	3.14	
NH4 - N (KCl Extr.)	mg/kg	43	6.15	0.60		42.7	2.99		10.0	0.62		3.59	0.41		175.0	20.7	
Phosphorus and Sulfur																	
PO4-P Bray P (1:10)	mg/kg	36	44.1	3.13		101.0	6.15		21.5	1.70		9.40	0.67		29.4	3.20	
PO4-P Bray P1 (1:7)	mg/kg	5	36.5	2.79		77.7	2.67		19.7	0.96		7.40	N/A		18.1	5.04	
PO4-P Olsen/Bicarb	mg/kg	47	27.0	1.84		41.9	2.58		12.2	1.20		7.00	1.40		24.0	3.00	
PO4-P AB-DTPA	mg/kg	2	16.9	N/A		38.6	N/A		9.89	N/A		3.45	N/A		14.0	N/A	
PO4-P Modified Morgan	mg/kg	5	16.4	N/A		18.7	N/A		4.30	N/A		2.80	N/A		5.30	N/A	
PO4-P True Morgan	mg/kg	7	18.4	1.69		26.3	2.03		4.80	0.20		2.90	0.10		5.35	0.11	
PO4-P Mod. Kelowna	mg/kg	1	36.0	N/A		59.0	N/A		15.0	N/A		7.00	N/A		25.0	N/A	
PO4-P Stong Bray (1:10)	mg/kg	10	81.9	2.12		148.0	11.5		28.2	2.19		31.0	2.05		93.0	3.66	
PO4-P Water Soluble	mg/kg																
SO4 - S (PO4 Extr.)	mg/kg	26	10.6	1.32		14.2	1.34		6.12	1.04		3.29	1.04		17.0	3.00	
Bases																	
K NH4OAc	mg/kg	63	153.0	7.08		247.0	17.5		111.0	6.00		141.0	5.00		198.0	21.6	
Ca NH4OAc	mg/kg	62	3150.0	265.0		863.0	64.4		1690.0	73.0		2150.0	106.0		2480.0	275.0	
Mg NH4OAc	mg/kg	62	246.0	7.24		145.0	11.0		244.0	11.5		480.0	20.4		179.0	19.5	
Na NH4OAc	mg/kg	49	45.0	3.16		16.0	2.45		12.3	2.34		12.0	2.31		8.80	2.00	

Bray Extractable K	mg/kg	6	110.0	5.90	228.0	10.1	85.5	3.47	105.0	8.41	139.0	7.97
K- Bicarb.	mg/kg	4	129.0	N/A	218.0	N/A	101.0	N/A	113.0	N/A	196.0	N/A
K - Modified Morgan	mg/kg	4	153.0	N/A	229.0	N/A	104.0	N/A	134.0	N/A	212.0	N/A
K - True Morgan	mg/kg	4	103.0	4.50	180.0	N/A	83.5	4.80	85.0	N/A	171.0	N/A
Ca Modified Morgan	mg/kg	3	4780.0	N/A	860.0	N/A	1730.0	N/A	2350.0	N/A	3860.0	N/A
Aluminum KCL Extr.	mg/kg	4	0.70	N/A	0.90	N/A	0.65	N/A	0.65	N/A	1.01	N/A

Mehlich-1 Multi Element

Scoop Soil Mass	g	5	5.00	N/A	5.00	N/A	5.00	N/A	5.00	N/A	5.00	N/A
P	mg/kg	7	38.1	3.21	75.7	3.53	15.8	2.51	19.8	1.05	3.58	1.84
K	mg/kg	7	92.8	5.88	211.0	4.22	72.6	1.70	93.3	3.12	139.0	2.78
Ca	mg/kg	7	4060.0	170.0	969.0	23.4	1450.0	29.3	2070.0	41.5	3630.0	247.0
Mg	mg/kg	7	276.0	22.8	155.0	3.10	215.0	4.30	505.0	15.6	195.0	8.61
Mn	mg/kg	6	55.2	3.24	151.0	3.09	104.0	3.47	39.2	0.78	502.0	76.8
Zn	mg/kg	7	4.94	0.37	32.8	1.89	2.00	0.30	1.99	0.26	1.44	0.065

Mehlich-3 Multi-Element

Scoop Soil Mass	g	21	2.00	0.078	2.40	0.060	1.89	0.060	2.09	0.070	1.65	0.067
Assumed Density	g/cm3	19	1.00	0.055	1.20	0.048	1.00	0.076	1.05	0.045	0.84	0.047
Volume of Scoop	cm3	16	2.00	0.040	2.00	0.04	2.00	0.040	2.00	0.040	2.00	0.040
Extractant Volume mL	mL	15	20.0	0.400	20.0	0.40	20.0	0.400	20.0	0.400	20.0	0.400
P Colorimetric	mg/kg	11	53.6	1.25	113.0	3.00	22.0	1.13	12.7	1.30	41.0	2.20
P ICP-AES	mg/kg	54	60.3	3.23	122.0	5.53	29.0	1.58	14.6	1.19	45.2	5.48
K	mg/kg	51	155.0	8.55	269.0	24.3	113.0	6.03	153.0	7.90	182.0	10.4
Ca	mg/kg	51	3930.0	174.0	1030.0	74.0	1800.0	112.0	2320.0	167.0	3260.0	303.0
Mg	mg/kg	50	278.0	15.7	173.0	13.2	263.0	10.0	556.0	30.7	207.0	12.0
Na	mg/kg	41	47.9	3.99	18.9	2.24	13.5	2.12	13.0	1.60	10.4	2.63
S	mg/kg	42	17.0	1.15	21.3	1.34	10.6	0.70	6.94	0.78	27.0	1.55
Al	mg/kg	34	608.0	37.4	343.0	15.1	504.0	18.7	683.0	31.1	800.0	49.5
Zn	mg/kg	48	6.70	0.30	35.8	2.44	2.53	0.18	2.51	0.25	1.33	0.15
Mn	mg/kg	46	115.0	8.49	162.0	7.94	158.0	8.66	78.9	4.06	355.0	26.5
Fe	mg/kg	47	220.0	7.96	404.0	17.1	194.0	13.1	150.0	10.5	601.0	50.8
Cu	mg/kg	48	2.81	0.19	9.75	0.55	1.50	0.17	2.84	0.18	0.32	0.085
B	mg/kg	38	0.77	0.060	0.91	0.085	0.41	0.078	0.94	0.080	0.90	0.16

Micronutrients

Zn - DTPA	mg/kg	55	3.63	0.21	17.7	1.19	1.58	0.085	1.30	0.100	0.84	0.060
Mn - DTPA	mg/kg	46	30.0	3.66	93.8	7.30	105.0	7.40	14.8	1.80	191.0	18.8
Fe - DTPA	mg/kg	47	60.5	5.12	68.6	9.50	52.1	3.78	22.3	2.00	312.0	23.1
Cu - DTPA	mg/kg	48	1.50	0.10	6.40	0.41	0.98	0.080	1.20	0.075	1.18	0.12
Zn - HCl	mg/kg											
Mn-H3PO4	mg/kg	7	37.4	2.23	107.0	3.65	89.2	4.10	23.7	1.00	330.0	20.2
Cl - Ca(NO3)2 Extr.	mg/kg	15	19.0	1.27	5.65	1.77	17.5	1.44	4.78	1.71	72.3	5.21
B - Hot Wat.	mg/kg	18	0.37	0.070	0.52	0.12	0.26	0.059	0.37	0.14	0.39	0.083
B - DTPA/Sorbitol	mg/kg	18	0.36	0.050	0.41	0.040	0.18	0.050	0.39	0.027	0.42	0.12

N & C

Total N - Kjeldahl	%	9	0.17	0.020	0.068	0.020	0.13	0.020	0.14	0.020	0.40	0.020
Total N - combustion	%	27	0.17	0.020	0.069	0.020	0.13	0.020	0.14	0.020	0.41	0.020
TOC - combustion	%	12	1.98	0.040	0.58	0.020	1.29	0.050	1.31	0.030	4.72	0.16
Total C - combustion	%	26	2.03	0.068	0.60	0.025	1.28	0.033	1.32	0.031	4.65	0.14
OM - Walkley-Black	%	18	3.40	0.20	1.14	0.070	2.12	0.16	2.34	0.15	7.56	0.65
OM - LOI (% Wt loss)	%	61	3.75	0.13	1.25	0.060	2.59	0.13	2.91	0.14	8.70	0.28

Miscellaneous

CaCO3 Content	%	10	1.30	0.24	0.47	0.13	0.61	0.13	0.91	0.39	1.75	0.39
CEC - Cation Displacement	cmol/kg	10	19.1	3.26	6.40	0.70	14.7	1.71	17.0	2.90	19.4	3.60
CEC - Estimation	cmol/kg	9	20.6	2.14	6.95	0.25	12.5	1.35	15.9	0.32	16.7	2.68
Soil Density (Scoop)	g/cc	10	1.15	0.023	1.39	0.042	1.12	0.031	1.20	0.030	0.96	0.020

Particle Size Analysis - Hydrometer

Sand 2000 - 50 um	%	30	18.0	2.20	60.3	1.87	16.0	3.02	31.9	2.69	43.6	2.48
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Silt 50 - 2 um	%	30	60.0	4.69	27.0	3.00	66.1	4.75	35.2	3.45	38.5	3.47
Clay 2 - 0 um	%	30	24.4	3.40	13.4	2.45	19.8	2.50	33.7	2.80	17.6	3.00
Particle Size Analysis - Pipette												
Sand 2000 - 50 um	%	5	16.0	N/A	58.5	N/A	11.0	N/A	29.0	N/A	44.0	N/A
Silt 50 - 2 um	%	5	62.5	N/A	30.5	N/A	70.0	N/A	40.0	N/A	41.5	N/A
Clay 2 - 0 um	%	5	22.8	N/A	12.2	N/A	18.2	N/A	31.0	N/A	16.2	N/A
Soil Health												
Autoclave-Citrate Extractable (ACE) protein	mg/g	2	5.95	N/A	4.31	N/A	5.39	N/A	4.27	N/A	16.5	N/A
Microbial CO2 respiration (1 day incubation-STCM)	mg/g	5	0.12	N/A	0.030	N/A	0.065	N/A	0.060	N/A	0.23	N/A
Microbial CO2 respiration (4 day incubation-STCM)	mg/g	1	0.15	N/A	0.090	N/A	0.090	N/A	0.12	N/A	0.30	N/A
Microbial enzyme activity - As	mg PNP/kg soil h											
Microbial enzyme activity - Beta Glucosidase (BG)	mg PNP/kg soil h	1	234.0	N/A	201.0	N/A	245.0	N/A	135.0	N/A	1310.0	N/A
Microbial enzyme activity - NAG	mg PNP/kg soil h											
Microbial enzyme activity - Pase	mg PNP/kg soil h											
PMN 7 day anaerobic	mg/kg											
Reactive carbon - permanganate oxidizable (POxC)	mg/kg	2	831.0	N/A	574.0	N/A	686.0	N/A	686.0	N/A	1300.0	N/A