# 2006 North American Proficiency Testing Program

## 4th Quarter Report - January 20, 2007

**Laboratory ID**

| Soil | | | Soil 2006-116 | | | Soil 2006-117 | | | Soil 2006-118 | | | Soil 2006-119 | | | Soil 2006-120 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 | % | 37 | 33.0 | *1.70* | | 45.3 | *3.75* | | 42.8 | *1.98* | | 38.0 | *2.00* | | 43.0 | *3.00* | |
| pH - sp | Unit | 43 | 7.92 | *0.18* | | 7.96 | *0.12* | | 5.99 | *0.13* | | 8.00 | *0.10* | | 7.87 | *0.11* | |
| ECe - sp | dS/m | 47 | 1.27 | *0.14* | | 9.27 | *1.36* | | 0.43 | *0.084* | | 0.39 | *0.04* | | 0.73 | *0.09* | |
| HCO3 - sp | mmolc/L | 17 | 2.60 | *0.60* | | 3.34 | *0.78* | | 1.04 | *0.36* | | 3.54 | *0.57* | | 5.24 | *1.13* | |
| Ca - sp | mmolc/L | 41 | 9.43 | *1.23* | | 14.9 | *2.52* | | 1.63 | *0.37* | | 2.61 | *0.40* | | 3.60 | *0.61* | |
| Mg - sp | mmolc/L | 41 | 2.88 | *0.40* | | 5.97 | *0.92* | | 0.84 | *0.21* | | 1.51 | *0.21* | | 1.31 | *0.22* | |
| Na - sp | mmolc/L | 41 | 0.91 | *0.18* | | 84.7 | *12.0* | | 0.64 | *0.21* | | 0.76 | *0.20* | | 3.61 | *0.39* | |
| SAR - sp | value | 36 | 0.37 | *0.07* | | 25.6 | *1.63* | | 0.54 | *0.17* | | 0.48 | *0.13* | | 2.25 | *0.22* | |
| Cl - sp | mmolc/L | 25 | 1.37 | *0.26* | | 48.7 | *6.02* | | 0.45 | *0.14* | | 0.25 | *0.12* | | 0.70 | *0.14* | |
| SO4 - sp | mmolc/L | 25 | 1.59 | *0.16* | | 53.3 | *7.59* | | 0.71 | *0.16* | | 0.41 | *0.10* | | 1.11 | *0.28* | |
| $NO_3$ - sp | mmolc/L | 19 | 7.09 | *1.55* | | 1.68 | *0.80* | | 1.13 | *0.59* | | 0.15 | *0.11* | | 0.41 | *0.33* | |
| B - sp | mg/L | 18 | 0.12 | *0.035* | | 0.30 | *0.078* | | 0.10 | *0.038* | | 0.19 | *0.040* | | 0.31 | *0.040* | |
| **Soil pH & EC** | | | | | | | | | | | | | | | | | |
| Soil EC (1:1) | (dS/m) | 32 | 0.44 | *0.046* | | 3.06 | *0.240* | | 0.20 | *0.054* | | 0.22 | *0.021* | | 0.36 | *0.041* | |
| Soil EC (1:2) | (dS/m) | 62 | 0.30 | *0.030* | | 2.30 | *0.341* | | 0.16 | *0.023* | | 0.16 | *0.020* | | 0.24 | *0.028* | |
| pH (1:1) Water | Unit | 96 | 8.20 | *0.11* | | 8.38 | *0.11* | | 6.00 | *0.10* | | 8.35 | *0.12* | | 8.30 | *0.10* | |
| pH (1:2) Water | Unit | 45 | 8.19 | *0.14* | | 8.60 | *0.11* | | 6.11 | *0.11* | | 8.34 | *0.19* | | 8.40 | *0.15* | |
| pH (1:1) 0.01M CaCl2 | Unit | 25 | 7.80 | *0.10* | | 8.14 | *0.10* | | 5.43 | *0.08* | | 7.78 | *0.08* | | 7.73 | *0.08* | |
| pH (1:2) 0.01M CaCl2 | Unit | 18 | 7.72 | *0.09* | | 8.10 | *0.09* | | 5.50 | *0.08* | | 7.71 | *0.09* | | 7.64 | *0.12* | |
| **Buffer pH, Lime Req.** | | | | | | | | | | | | | | | | | |
| SMP Buffer pH | Unit | 54 | 7.51 | *0.08* | | 7.60 | *0.08* | | 6.49 | *0.09* | | 7.50 | *0.08* | | 7.50 | *0.08* | |
| Adams-Evans Buf pH | Unit | 12 | 7.89 | *0.08* | | 7.89 | *0.08* | | 7.40 | *0.08* | | 7.83 | *0.08* | | 7.81 | *0.08* | |
| Woodruff Buf. pH | Unit | 17 | 7.15 | *0.08* | | 7.17 | *0.08* | | 6.50 | *0.08* | | 7.14 | *0.08* | | 7.13 | *0.08* | |
| Mehlich Buffer pH | Unit | 4 | 6.80 | *0.12* | | 6.80 | *0.09* | | 6.09 | *0.08* | | 6.86 | *0.08* | | 6.82 | *0.08* | |
| Titratable Acidity | cmol/kg | 1 | 0.70 | *0.00* | | 0.10 | *0.00* | | 12.7 | *0.00* | | 1.31 | *0.00* | | 2.36 | *0.00* | |

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## 4th Quarter Report - January 20, 2007

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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]** |
| **Inorganic Nitrogen (NO3-N & NH4-N)** | | | | | | | | | | | | | | | | | |
| NO3-N Cd. Rd. | mg/kg | 72 | 37.9 | *1.82* | | 18.4 | *1.12* | | 20.0 | *1.02* | | 3.29 | *0.47* | | 10.6 | *0.84* | |
| NO3-N ISE | mg/kg | 24 | 35.1 | *6.25* | | 24.2 | *9.59* | | 16.6 | *3.16* | | 6.81 | *4.79* | | 12.6 | *5.90* | |
| NO3-N CTA | mg/kg | 7 | 37.0 | *3.80* | | 19.6 | *0.50* | | 20.2 | *1.66* | | 4.00 | *0.52* | | 11.9 | *0.20* | |
| NO3-N Ion Chr. | mg/kg | 2 | 38.5 | *0.30* | | 20.4 | *1.35* | | 21.7 | *1.35* | | 3.85 | *0.75* | | 11.8 | *0.05* | |
| NO3-N Other _____ | mg/kg | 11 | 38.5 | *4.00* | | 19.2 | *1.80* | | 20.0 | *2.09* | | 3.90 | *0.84* | | 11.2 | *1.80* | |
| NH4 - N (KCl Extr.) | mg/kg | 62 | 2.35 | *0.63* | | 2.50 | *0.63* | | 3.90 | *0.83* | | 3.05 | *0.55* | | 5.54 | *0.61* | |
| **Phosphorus and Sulfur** | | | | | | | | | | | | | | | | | |
| PO4-P Bray P (1:10) | mg/kg | 54 | 44.7 | *4.73* | | 3.10 | *1.65* | | 140 | *22.0* | | 27.0 | *2.42* | | 30.0 | *3.75* | |
| PO4-P Bray P1 (1:7) | mg/kg | 10 | 30.2 | *2.40* | | 2.65 | *1.05* | | 90.1 | *8.61* | | 18.3 | *2.59* | | 25.8 | *3.20* | |
| PO4-P Olsen/Bicarb | mg/kg | 62 | 15.0 | *1.92* | | 4.24 | *0.98* | | 48.0 | *5.83* | | 10.8 | *1.30* | | 16.1 | *1.75* | |
| PO4-P AB-DTPA | mg/kg | 2 | 10.7 | *2.60* | | 2.85 | *0.05* | | 30.4 | *12.7* | | 5.16 | *0.26* | | 11.7 | *2.10* | |
| PO4-P M. Morgan | mg/kg | 8 | 33.3 | *4.78* | | 10.4 | *2.13* | | 6.00 | *0.47* | | 23.3 | *2.10* | | 24.7 | *4.00* | |
| PO4-P Mod. Kewlona | mg/kg | 6 | 33.6 | *6.00* | | 8.33 | *2.50* | | 83.0 | *11.0* | | 22.4 | *3.84* | | 35.4 | *3.64* | |
| PO4-P Stong Bray (1:10) | mg/kg | 12 | 215 | *15.5* | | 41.3 | *6.25* | | 261 | *25.0* | | 284 | *35.0* | | 169 | *11.8* | |
| PO4-P Water Soluble | mg/kg | 5 | 1.00 | *0.70* | | 1.60 | *1.40* | | 0.92 | *0.62* | | 0.70 | *0.50* | | 4.60 | *3.80* | |
| SO4 - S (PO4 Extr.) | mg/kg | 42 | 12.0 | *2.48* | | 165 | *73.5* | | 13.0 | *4.00* | | 4.15 | *1.50* | | 8.41 | *2.60* | |
| **Bases** | | | | | | | | | | | | | | | | | |
| K Ammonium Acetate | mg/kg | 96 | 202 | *14.5* | | 288 | *19.5* | | 330 | *19.2* | | 250 | *19.1* | | 2744 | *486* | |
| Ca Ammonium Acetate | mg/kg | 90 | 3631 | *479* | | 3812 | *514* | | 844 | *79.5* | | 4180 | *507* | | 4549 | *734* | |
| Mg Ammonium Acetate | mg/kg | 90 | 296 | *24.9* | | 369 | *31.5* | | 129 | *12.6* | | 635 | *55.0* | | 451 | *49.0* | |
| Na Ammonium Acetate | mg/kg | 72 | 24.2 | *6.25* | | 1746 | *143* | | 25.0 | *8.00* | | 29.0 | *5.00* | | 441 | *81.3* | |
| Bray Extractable K | mg/kg | 4 | 171 | *5.5* | | 212 | *2.68* | | 272 | *9.9* | | 192 | *2.1* | | 1125 | *39.6* | |
| K- Bicarb. | mg/kg | 7 | 135 | *9.0* | | 220 | *10.0* | | 335 | *11.0* | | 156 | *6.0* | | 2042 | *80.0* | |
| K Modified Morgan | mg/kg | 6 | 112 | *11.5* | | 182 | *21.0* | | 314 | *15.0* | | 120 | *8.5* | | 1611 | *146* | |
| Ca Modified Morgan | mg/kg | 3 | 11205 | *1183* | | 18852 | *1038* | | 920 | *127* | | 11496 | *1029* | | 20157 | *993* | |
| Aluminum KCL Extr. | mg/kg | 4 | 0.24 | *0.24* | | 0.03 | *0.03* | | 0.50 | *0.50* | | 0.13 | *0.13* | | 0.01 | *0.005* | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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]** |
| **Mehlich-1 Multi Element (scoop)** | | | | | | | | | | | | | | | | | |
| Scoop Soil Mass | g | 9 | 5.00 | *0.00* | | 5.00 | *0.00* | | 5.00 | *0.00* | | 5.00 | *0.00* | | 5.00 | *0.00* | |
| P | mg/kg | 10 | 32.6 | *5.37* | | 6.55 | *1.17* | | 49.2 | *7.71* | | 42.2 | *6.76* | | 27.6 | *4.06* | |
| K | mg/kg | 10 | 73.8 | *13.7* | | 114 | *18.1* | | 277 | *18.5* | | 64.7 | *11.8* | | 256 | *51.6* | |
| Ca | mg/kg | 10 | 5036 | *374* | | 4610 | *323* | | 1006 | *68.2* | | 4798 | *320* | | 5018 | *323* | |
| Mg | mg/kg | 10 | 436 | *64.7* | | 282 | *21.9* | | 131 | *10.1* | | 604 | *43.8* | | 312 | *20.8* | |
| Mn | mg/kg | 10 | 5.66 | *0.55* | | 5.53 | *1.52* | | 20.3 | *1.91* | | 3.83 | *1.00* | | 1.52 | *0.36* | |
| Zn | mg/kg | 8 | 0.11 | *0.05* | | 0.04 | *0.04* | | 2.94 | *0.20* | | 0.04 | *0.04* | | 0.06 | *0.06* | |
| **Mehlich-3 Mult-Element (scoop)** | | | | | | | | | | | | | | | | | |
| Scoop Soil Mass | g | 31 | 2.16 | *0.29* | | 2.06 | *0.35* | | 2.13 | *0.25* | | 1.95 | *0.31* | | 1.94 | *0.40* | |
| Assumed Density | g/cm3 | 19 | 1.18 | *0.02* | | 1.16 | *0.02* | | 1.18 | *0.04* | | 1.13 | *0.05* | | 1.05 | *0.13* | |
| Volume of Scoop | cm3 | 33 | 2.00 | *0.30* | | 2.00 | *0.30* | | 2.00 | *0.30* | | 2.00 | *0.30* | | 2.00 | *0.30* | |
| Extractrant Volume mL | mL | 36 | 20.0 | *0.00* | | 20.0 | *0.00* | | 20.0 | *0.00* | | 20.0 | *0.00* | | 20.0 | *0.00* | |
| P Colorimetric | mg/kg | 22 | 58.6 | *6.16* | | 16.0 | *1.00* | | 113 | *11.6* | | 38.2 | *3.25* | | 48.8 | *4.80* | |
| P ICP-AES | mg/kg | 46 | 65.2 | *5.85* | | 16.2 | *1.93* | | 113 | *11.8* | | 41.0 | *3.46* | | 54.1 | *3.45* | |
| K | mg/kg | 55 | 237 | *16.5* | | 323 | *18.0* | | 334 | *26.6* | | 280 | *16.8* | | 2632 | *280* | |
| Ca | mg/kg | 53 | 5105 | *347* | | 5555 | *394* | | 973 | *109* | | 5480 | *420* | | 5872 | *548* | |
| Mg | mg/kg | 53 | 460 | *29.5* | | 507 | *34.7* | | 146 | *11.4* | | 870 | *68.6* | | 533 | *39.2* | |
| Na | mg/kg | 38 | 26.3 | *7.53* | | 1786 | *198* | | 23.5 | *10.8* | | 29.5 | *5.50* | | 410 | *35.5* | |
| S | mg/kg | 37 | 20.6 | *4.05* | | 402 | *35.8* | | 26.0 | *5.67* | | 14.0 | *5.00* | | 20.3 | *2.20* | |
| Al | mg/kg | 27 | 450 | *83.9* | | 75.3 | *59.7* | | 1604 | *136* | | 387 | *59.1* | | 380 | *75.7* | |
| Zn | mg/kg | 46 | 5.83 | *0.57* | | 2.00 | *0.28* | | 3.13 | *0.28* | | 4.40 | *0.40* | | 2.50 | *0.24* | |
| Mn | mg/kg | 43 | 196 | *20.7* | | 107 | *6.90* | | 27.6 | *4.55* | | 235 | *20.4* | | 195 | *17.7* | |
| Fe | mg/kg | 40 | 79.0 | *11.0* | | 32.1 | *4.68* | | 94.2 | *11.3* | | 86.2 | *11.8* | | 40.2 | *6.03* | |
| Cu | mg/kg | 44 | 2.71 | *0.33* | | 2.32 | *0.26* | | 1.30 | *0.13* | | 4.50 | *0.30* | | 2.70 | *0.30* | |
| B | mg/kg | 38 | 1.69 | *0.26* | | 2.48 | *0.29* | | 0.70 | *0.18* | | 2.91 | *0.46* | | 2.86 | *0.36* | |

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| **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]** |
| **Micronutrients** | | | | | | | | | | | | | | | | | |
| Zn - DTPA | mg/kg | 75 | 1.66 | *0.14* | | 0.70 | *0.08* | | 1.97 | *0.16* | | 1.22 | *0.10* | | 0.86 | *0.08* | |
| Mn - DTPA | mg/kg | 67 | 9.00 | *1.40* | | 5.25 | *1.05* | | 7.81 | *0.93* | | 9.59 | *1.60* | | 6.50 | *1.70* | |
| Fe - DTPA | mg/kg | 68 | 6.08 | *0.57* | | 1.68 | *0.30* | | 39.9 | *7.67* | | 7.70 | *0.90* | | 3.24 | *0.52* | |
| Cu - DTPA | mg/kg | 68 | 0.81 | *0.09* | | 0.80 | *0.10* | | 0.78 | *0.10* | | 1.64 | *0.16* | | 0.99 | *0.12* | |
| Zn - HCl | mg/kg | 7 | 0.30 | *0.17* | | 0.11 | *0.01* | | 3.23 | *0.21* | | 0.20 | *0.07* | | 0.37 | *0.27* | |
| Mn-H3PO4 | mg/kg | 9 | 8.11 | *1.59* | | 8.59 | *1.34* | | 15.3 | *0.91* | | 5.64 | *1.39* | | 2.75 | *1.08* | |
| Cl - Ca(NO3)2 Extr. | mg/kg | 20 | 15.0 | *2.34* | | 726 | *84.8* | | 6.95 | *1.95* | | 3.00 | *1.22* | | 10.0 | *2.18* | |
| B - Hot Wat. | mg/kg | 54 | 0.68 | *0.12* | | 1.04 | *0.26* | | 0.58 | *0.12* | | 1.12 | *0.23* | | 1.38 | *0.28* | |
| B-DTPA/Sorbitol | mg/kg | 9 | 0.70 | *0.05* | | 1.28 | *0.08* | | 0.20 | *0.05* | | 1.34 | *0.15* | | 1.44 | *0.24* | |
| **Soil Organic Matter** | | | | | | | | | | | | | | | | | |
| Soil Kjeldahl N | % | 29 | 0.11 | *0.011* | | 0.08 | *0.011* | | 0.21 | *0.02* | | 0.14 | *0.01* | | 0.16 | *0.013* | |
| Soil TN (combustion) | % | 40 | 0.11 | *0.011* | | 0.08 | *0.009* | | 0.24 | *0.02* | | 0.13 | *0.01* | | 0.17 | *0.010* | |
| Soil TOC (Combustion) | % | 32 | 6.85 | *0.64* | | 1.69 | *0.130* | | 2.62 | *0.10* | | 5.25 | *0.47* | | 2.41 | *0.17* | |
| SOM - Walkley-Black | % | 45 | 1.85 | *0.15* | | 1.30 | *0.100* | | 4.40 | *0.30* | | 2.18 | *0.24* | | 2.80 | *0.30* | |
| SOM - LOI (% Wt loss) | % | 82 | 1.90 | *0.18* | | 1.36 | *0.180* | | 5.40 | *0.28* | | 2.50 | *0.19* | | 3.80 | *0.36* | |
| CaCO3 Content | % | 15 | 16.3 | *8.86* | | 8.45 | *0.67* | | 0.40 | *0.38* | | 18.7 | *11.7* | | 7.05 | *1.10* | |
| CEC - Cation Displacement | cmol/kg | 25 | 13.4 | *2.04* | | 15.5 | *1.65* | | 12.0 | *2.34* | | 18.2 | *2.04* | | 30.5 | *4.07* | |
| CEC - Estimation | cmol/kg | 17 | 24.1 | *5.37* | | 32.2 | *6.48* | | 9.35 | *2.97* | | 29.5 | *4.18* | | 41.8 | *4.37* | |
| Soil Density (Scoop) | g/cc | 18 | 1.21 | *0.09* | | 1.17 | *0.09* | | 1.22 | *0.05* | | 1.11 | *0.04* | | 1.00 | *0.07* | |
| **Particle Size Analysis** | | | | | | | | | | | | | | | | | |
| Sand 2000 - 50 um | % | 49 | 25.0 | *3.78* | | 20.8 | *3.46* | | 60.0 | *3.00* | | 18.9 | *3.56* | | 33.0 | *3.05* | |
| Silt 50 - 2 um | % | 49 | 58.0 | *4.12* | | 55.8 | *4.10* | | 33.1 | *3.08* | | 56.8 | *4.75* | | 45.9 | *4.03* | |
| Clay 2 - 0 um | % | 49 | 17.6 | *2.91* | | 23.0 | *1.85* | | 7.2 | *1.53* | | 24.9 | *3.10* | | 21.0 | *2.60* | |

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