Supplementary Table S1. *Soil pH (0.01 mol/l calcium chloride [CaCl2]), total acidity (hydrogen + aluminium, H+Al), exchangeable aluminium (Al), soil organic matter, phosphorus (P), exchangeable calcium (Ca), magnesium (Mg) and potassium (K) levels, and base saturation in soil samples collected 36 and 48 months after the last reapplication of lime rates at Botucatu, São Paulo State, Brazil\**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Soil layer (m) | Lime rate (kg/ha) | | | | Equation | *R*2 | *P* > F |
| 0 | 1000 | 2000 | 4000 |
|  | **pH (CaCl2), 36 months** | | | |  |  |  |
| 0–0.05 | 4.0 | 4.5 | 5.5 | 6.3 | y = 0.0006x + 4.042 | 0.97 | < 0.001 |
| 0.05–0.10 | 3.8 | 4.2 | 4.7 | 5.6 | y = 0.0004x + 3.786 | 0.99 | < 0.001 |
| 0.10–0.20 | 3.8 | 4.1 | 4.3 | 4.9 | y = 0.0003x + 3.794 | 0.99 | < 0.001 |
| 0.20–0.40 | 3.8 | 4.0 | 4.2 | 4.2 | y = 0.001x + 3.878 | 0.86 | < 0.001 |
| 0.40–0.60 | 3.9 | 4.0 | 4.0 | 4.1 | y = 6E-05x + 3.884 | 0.91 | < 0.01 |
|  | **pH (CaCl2), 48 months** | | | |  |  |  |
| 0–0.05 | 3.8 | 4.3 | 4.6 | 5.9 | y = 0.0005x + 3.735 | 0.98 | < 0.001 |
| 0.05–0.10 | 3.7 | 4.1 | 4.5 | 5.8 | y = 0.0005x + 3.61 | 0.98 | < 0.001 |
| 0.10–0.20 | 3.7 | 4.2 | 4.2 | 5.2 | y = 0.0004x + 3.69 | 0.95 | < 0.001 |
| 0.20–0.40 | 3.8 | 4.1 | 4.1 | 4.4 | y = 0.001x + 3.84 | 0.93 | < 0.001 |
| 0.40–0.60 | 3.9 | 4.0 | 4.1 | 4.2 | y = 0.00008x + 3.88 | 0.98 | < 0.001 |
|  | **H+Al (mmolc/dm3), 36 months** | | | |  |  |  |
| 0–0.05 | 94 | 78 | 47 | 26 | y = -0.0174x + 91.864 | 0.95 | < 0.001 |
| 0.05–0.10 | 105 | 90 | 70 | 46 | y = -0.015x + 103.77 | 0.98 | < 0.001 |
| 0.10–0.20 | 101 | 98 | 81 | 59 | y = -0.0113x + 104.49 | 0.96 | < 0.001 |
| 0.20–0.40 | 110 | 109 | 98 | 81 | y = -0.0078x + 113.49 | 0.95 | < 0.001 |
| 0.40–0.60 | 122 | 125 | 122 | 109 | y = -0.0037x + 126.14 | 0.75 | < 0.05 |
|  | **H+Al (mmolc/dm3), 48 months** | | | |  |  |  |
| 0–0.05 | 109 | 90 | 70 | 28 | y = -0.0204x + 109.99 | 0.99 | < 0.001 |
| 0.05–0.10 | 108 | 95 | 79 | 31 | y = -0.0196x + 112.87 | 0.98 | < 0.001 |
| 0.10–0.20 | 103 | 91 | 85 | 41 | y = -0.0154x + 106.86 | 0.94 | < 0.001 |
| 0.20–0.40 | 109 | 107 | 105 | 65 | y = -0.0112x + 116.20 | 0.83 | < 0.001 |
| 0.40–0.60 | 132 | 118 | 119 | 109 | y = -0.0051x + 128.51 | 0.81 | < 0.001 |
|  | **Exchangeable Al3+ (mmolc/dm3),**  **36 months** | | | |  |  |  |
| 0–0.05 | 10.0 | 4.6 | 0.0 | 0.0 | y = -0.0024x + 7.832 | 0.73 | < 0.001 |
| 0.05–0.10 | 15.4 | 7.8 | 2.5 | 0.0 | y = -0.0037x + 12.870 | 0.85 | < 0.001 |
| 0.10–0.20 | 17.1 | 11.5 | 5.3 | 0.0 | y = -0.0043x + 15.934 | 0.95 | < 0.001 |
| 0.20–0.40 | 18.8 | 15.0 | 10.8 | 6.3 | y = -0.0031x + 18.166 | 0.97 | < 0.001 |
| 0.40–0.60 | 20.8 | 18.8 | 17.2 | 11.9 | y = -0.0022x + 21.060 | 0.98 | < 0.001 |
|  | **Exchangeable Al3+ (mmolc/dm3),**  **48 months** | | | |  |  |  |
| 0–0.05 | 20.0 | 12.5 | 3.6 | 0.0 | y = -0.0050x + 17.72 | 0.89 | < 0.001 |
| 0.05–0.10 | 26.7 | 18.3 | 8.4 | 0.0 | y = -0.0067x + 25.00 | 0.96 | < 0.001 |
| 0.10–0.20 | 26.5 | 18.3 | 13.8 | 1.4 | y = -0.0061x + 25.66 | 0.99 | < 0.001 |
| 0.20–0.40 | 30.2 | 24.8 | 21.9 | 9.7 | y = -0.0051x + 30.50 | 0.99 | < 0.001 |
| 0.40–0.60 | 32.7 | 30.2 | 27.8 | 22.0 | y = -0.0027x + 32.85 | 0.99 | < 0.001 |
|  | **Soil organic matter (g/dm3),**  **36 months** | | | |  |  |  |
| 0–0.05 | 26.8 | 26.4 | 30.5 | 29.6 | y = 0.0009x + 26.772 | 0.52 | < 0.05 |
| 0.05–0.10 | 19.5 | 20.1 | 20.5 | 20.7 | y = 0.0003x + 19.706 | 0.83 | < 0.05 |
| 0.10–0.20 | 17.9 | 18.4 | 18.9 | 20.1 | y = 0.0005x + 17.88 | 0.99 | < 0.05 |
| 0.20–0.40 | 18.0 | 17.8 | 17.8 | 19.2 | - | - | ns |
| 0.40–0.60 | 20.8 | 21.4 | 22.7 | 21.3 | - | - | ns |
|  | **Soil organic matter (g/dm3),**  **48 months** | | | |  |  |  |
| 0–0.05 | 24.4 | 27.4 | 28.7 | 28.2 | y = 0.0008x + 25.73 | 0.56 | < 0.01 |
| 0.05–0.10 | 15.3 | 17.8 | 18.5 | 18.3 | y = 0.0006x + 16.37 | 0.56 | < 0.01 |
| 0.10–0.20 | 12.6 | 15.3 | 16.6 | 15.2 | y = -7E-07x2 + 0.0034x + 12.605 | 1.00 | < 0.05 |
| 0.20–0.40 | 12.6 | 14.5 | 14.6 | 14.1 | y = -4E-07x2 + 0.0018x + 12.685 | 0.92 | < 0.05 |
| 0.40–0.60 | 13.3 | 14.3 | 16.2 | 14.3 | y = -5E-07x2 + 0.0023x + 13.09 | 0.85 | < 0.05 |
|  | **P resin (mg/dm3), 36 months** | | | |  |  |  |
| 0–0.05 | 47.4 | 39.7 | 53.1 | 61.7 | y = 0.0045x + 42.622 | 0.68 | < 0.01 |
| 0.05–0.10 | 41.4 | 43.6 | 44.9 | 47.6 | y = 0.0015x + 41.738 | 0.98 | < 0.05 |
| 0.10–0.20 | 23.3 | 25.2 | 28.0 | 30.0 | y = 0.0017x + 23.690 | 0.95 | < 0.05 |
| 0.20–0.40 | 5.8 | 7.0 | 8.0 | 8.1 | y = 0.0006x + 6.230 | 0.78 | < 0.01 |
| 0.40–0.60 | 4.7 | 6.3 | 5.6 | 7.7 | y = 0.0007x + 4.892 | 0.79 | < 0.05 |
|  | **P resin (mg/dm3), 48 months** | | | |  |  |  |
| 0–0.05 | 50.6 | 40.4 | 50.0 | 58.4 | y = 0.0029x + 44.81 | 0.44 | < 0.05 |
| 0.05–0.10 | 30.6 | 41.6 | 43.0 | 43.5 | y = 0.0027x + 34.87 | 0.58 | < 0.05 |
| 0.10–0.20 | 16.6 | 21.4 | 18.9 | 19.1 | y = -6E-07x2 + 0.0027x + 17.313 | 0.41 | < 0.05 |
| 0.20–0.40 | 6.0 | 6.5 | 4.8 | 4.6 | y = -0.0004x + 6.21 | 0.62 | < 0.05 |
| 0.40–0.60 | 2.7 | 3.9 | 3.4 | 4.0 | y = 0.00024x + 3.09 | 0.48 | < 0.05 |
|  | **Exchangeable Ca2+ (mmolc/dm3),**  **36 months** | | | |  |  |  |
| 0–0.05 | 3.7 | 13.2 | 33.4 | 47.4 | y = 0.0113x + 4.680 | 0.95 | < 0.001 |
| 0.05–0.10 | 0.8 | 7.4 | 21.5 | 33.3 | y = 0.0084x + 1.072 | 0.96 | < 0.001 |
| 0.10–0.20 | 1.0 | 5.7 | 13.2 | 27.7 | y = 0.0068x – 0.050 | 0.99 | < 0.001 |
| 0.20–0.40 | 1.0 | 2.7 | 5.8 | 14.6 | y = 0.0035x – 0.126 | 0.96 | < 0.001 |
| 0.40–0.60 | 1.0 | 1.8 | 3.6 | 8.3 | y = 0.0019x + 0.374 | 0.96 | < 0.001 |
|  | **Exchangeable Ca2+ (mmolc/dm3),**  **48 months** | | | |  |  |  |
| 0–0.05 | 4.9 | 14.3 | 22.5 | 44.5 | y = 0.0099x + 4.29 | 0.99 | < 0.001 |
| 0.05–0.10 | 2.1 | 11.6 | 16.6 | 33.4 | y = 0.0076x + 2.55 | 0.99 | < 0.001 |
| 0.10–0.20 | 1.6 | 9.1 | 10.4 | 21.4 | y = 0.0047x + 2.43 | 0.97 | < 0.001 |
| 0.20–0.40 | 1.7 | 6.7 | 6.6 | 9.6 | y = 0.0017x + 3.12 | 0.82 | < 0.001 |
| 0.40–0.60 | 2.3 | 5.0 | 4.0 | 7.5 | y = 0.0012x + 2.64 | 0.82 | < 0.001 |
|  | **Exchangeable Mg2+ (mmolc/dm3), 36 months** | | | |  |  |  |
| 0–0.05 | 3.3 | 8.9 | 22.0 | 30.8 | y = 0.0071x + 3.778 | 0.95 | < 0.001 |
| 0.05–0.10 | 1.3 | 6.3 | 13.6 | 18.3 | y = 0.0043x + 2.382 | 0.94 | < 0.001 |
| 0.10–0.20 | 1.2 | 5.0 | 8.0 | 13.4 | y = 0.0030x + 1.624 | 0.99 | < 0.001 |
| 0.20–0.40 | 1.1 | 3.6 | 4.8 | 5.8 | y = 0.0011x + 1.894 | 0.85 | < 0.001 |
| 0.40–0.60 | 0.9 | 3.1 | 4.2 | 5.3 | y = 0.0010x + 1.528 | 0.89 | < 0.001 |
|  | **Exchangeable Mg2+ (mmolc/dm3), 48 months** | | | |  |  |  |
| 0–0.05 | 2.7 | 6.1 | 10.0 | 22.1 | y = 0.0049x + 1.634 | 0.98 | < 0.001 |
| 0.05–0.10 | 1.3 | 5.4 | 7.8 | 18.5 | y = 0.0043x + 0.778 | 0.98 | < 0.001 |
| 0.10–0.20 | 0.8 | 4.5 | 5.4 | 12.4 | y = 0.0028x + 0.873 | 0.97 | < 0.001 |
| 0.20–0.40 | 0.7 | 3.4 | 3.9 | 6.6 | y = 0.0014x + 1.223 | 0.95 | < 0.001 |
| 0.40–0.60 | 1.1 | 2.4 | 2.2 | 4.7 | y = 0.0008x + 1.158 | 0.91 | < 0.001 |
|  | **Exchangeable K+ (mmolc/dm3),**  **36 months** | | | |  |  |  |
| 0–0.05 | 3.0 | 2.9 | 3.2 | 3.2 | - | - | ns |
| 0.05–0.10 | 1.7 | 2.0 | 2.0 | 1.5 | - | - | ns |
| 0.10–0.20 | 1.3 | 1.3 | 1.1 | 1.0 | y = -0.001x + 1.341 | 0.98 | ns |
| 0.20–0.40 | 0.8 | 0.8 | 0.5 | 0.4 | y = -0.001x + 0.83 | 0.88 | < 0.01 |
| 0.40–0.60 | 0.5 | 0.4 | 0.3 | 0.3 | y = -5E-05x + 0.46 | 0.73 | < 0.05 |
|  | **Exchangeable K+ (mmolc/dm3),**  **48 months** | | | |  |  |  |
| 0–0.05 | 3.0 | 2.9 | 2.7 | 2.2 | y = -0.00020x + 3.07 | 0.98 | < 0.001 |
| 0.05–0.10 | 2.0 | 1.6 | 1.7 | 1.6 | y = -0.00006x + 1.83 | 0.42 | < 0.05 |
| 0.10–0.20 | 1.3 | 1.2 | 0.9 | 1.0 | y = -0.00008x + 1.26 | 0.62 | < 0.01 |
| 0.20–0.40 | 1.3 | 1.0 | 0.7 | 0.6 | y = -0.0015x + 1.16 | 0.87 | < 0.001 |
| 0.40–0.60 | 1.0 | 0.7 | 0.5 | 0.4 | y = -0.0015x + 0.91 | 0.85 | < 0.001 |
|  | **Base saturation (%), 36 months** | | | |  |  |  |
| 0–0.05 | 10 | 25 | 59 | 81 | y = 0.0185x + 11.428 | 0.95 | < 0.001 |
| 0.05–0.10 | 4 | 16 | 37 | 53 | y = 0.0126x + 5.372 | 0.96 | < 0.001 |
| 0.10–0.20 | 3 | 12 | 22 | 42 | y = 0.0097x + 2.910 | 0.99 | < 0.001 |
| 0.20–0.40 | 3 | 7 | 11 | 21 | y = 0.0045x + 2.604 | 0.99 | < 0.001 |
| 0.40–0.60 | 2 | 6 | 8 | 14 | y = 0.0029x + 2.442 | 0.99 | < 0.001 |
|  | **Base saturation (%), 48 months** | | | |  |  |  |
| 0–0.05 | 9 | 21 | 33 | 71 | y = 0.0157x + 6.049 | 0.98 | < 0.001 |
| 0.05–0.10 | 5 | 17 | 25 | 63 | y = 0.0146x + 1.734 | 0.97 | < 0.001 |
| 0.10–0.20 | 4 | 14 | 17 | 46 | y = 0.01039x + 1.912 | 0.95 | < 0.001 |
| 0.20–0.40 | 3 | 10 | 10 | 20 | y = 0.0041x + 3.604 | 0.95 | < 0.001 |
| 0.40–0.60 | 3 | 6 | 5 | 10 | y = 0.0016x + 3.465 | 0.85 | < 0.001 |

ns, not significant

\*The degrees of freedom of the treatments, blocks, and error were 3, 3, and 9, respectively.