**Appendix A:** Potato shoot biomass (Wsh), shoot N concentration (Nsh), shoot N nutrition index (NNIsh), tuber biomass (Wt), tuber N concentration (Nt), and tuber N nutrition index (NNIt) on different sampling dates in four years for the cultivars Innovator, Gem Russet, Umatilla Russet, Bannock Russet, and Markies Russet grown under four N fertilization rates in Argentina. Data points used for the critical N dilution curves are highlighted in bold. DAP, days after planting.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Wsh | | | |  | Nsh | | | |  | NNIsh | | | |  | Wt | | | |  | Nt | | | |  | NNIt | | | |  |
|  |  |  | (Mg DM ha-1) | | | |  | (g 100 g-1 DM) | | | |  |  |  |  |  |  | (Mg DM ha-1) | | | |  | (g 100 g-1 DM) | | | |  |  |  |  |  |  |
|  |  | DAP | 0 | 80 | 150 | 250 |  | 0 | 80 | 150 | 250 |  | 0 | 80 | 150 | 250 |  | 0 | 80 | 150 | 250 |  | 0 | 80 | 150 | 250 |  | 0 | 80 | 150 | 250 |  |
| Innovator | 2003-04 | 45 | 0.5 | 0.6 | 0.8 | **1.0** | \* | 4.3 | 4.4 | 5.3 | **5.2** | \* | 0.71 | 0.78 | 1.00 | 1.05 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 60 | **2.9** | 3.1 | 3.6 | 4.5 | \* | **3.9** | 3.7 | 3.9 | 4.2 | \* | 1.00 | 0.98 | 1.08 | 1.21 | \* | 1.5 | 1.8 | 2.0 | 2.0 | ns | 1.1 | 1.2 | 1.3 | 1.3 | ns | 0.77 | 0.81 | 0.91 | 0.93 | ns |
|  |  | 75 | 4.2 | 6.0 | **6.1** | 7.8 | \* | 3.2 | 3.3 | **3.3** | 3.4 | ns | 0.92 | 1.03 | 1.03 | 1.12 | \* | 2.5 | **3.5** | 4.4 | 5.1 | \* | 1.1 | **1.2** | 1.3 | 1.3 | \* | 0.82 | 0.97 | 0.96 | 1.04 | \* |
|  |  | 90 | 4.2 | 5.4 | 5.4 | 7.9 | \* | 2.3 | 2.4 | 2.6 | 3.1 | ns | 0.64 | 0.71 | 0.78 | 0.84 | ns | 5.0 | 6.3 | 7.0 | 8.1 | ns | 0.8 | 0.9 | 1.1 | 1.2 | ns | 0.84 | 0.85 | 0.95 | 1.01 | ns |
|  |  | 110 | 4.2 | 4.7 | 4.6 | 6.3 | \* | 1.9 | 2.0 | 2.2 | 2.6 | \* | 0.54 | 0.59 | 0.62 | 0.80 | ns | 11.7 | 12.5 | 12.6 | 16.1 | ns | 0.8 | 0.9 | 1.0 | 1.0 | ns | 0.86 | 0.91 | 1.06 | 1.12 | ns |
|  | 2004-05 | 55 | **1.8** | 2.2 | 2.2 | 2.2 | \* | **4.4** | 4.8 | 4.9 | 5.2 | \* | 1.00 | 1.16 | 1.20 | 1.27 | \* | 0.6 | 0.9 | 0.9 | 1.0 | ns | 1.2 | 1.3 | 1.3 | 1.4 | ns | 0.67 | 0.77 | 0.82 | 0.85 | \* |
|  |  | 61 | **2.7** | 3.1 | 3.2 | 3.7 | \* | **4.0** | 4.6 | 4.8 | 5.2 | ns | 1.09 | 1.20 | 1.28 | 1.42 | \* | 2.2 | **2.5** | 2.7 | 3.1 | \* | 1.1 | **1.3** | 1.4 | 1.4 | \* | 0.84 | 1.01 | 0.96 | 1.00 | \* |
|  |  | 83 | **4.9** | 5.3 | 6.1 | 7.3 | \* | **3.4** | 3.8 | 3.9 | 4.8 | \* | 0.97 | 1.13 | 1.20 | 1.54 | \* | **4.8** | 5.5 | 7.0 | 8.4 | \* | **1.2** | 1.4 | 1.4 | 1.4 | \* | 0.86 | 1.09 | 1.15 | 1.25 | \* |
|  |  | 110 | 5.2 | 5.3 | 7.2 | 7.9 | \* | 1.8 | 1.7 | 1.9 | 2.0 | ns | 0.53 | 0.51 | 0.61 | 0.65 | ns | **11.6** | 12.0 | 12.7 | 14.7 | \* | **1.0** | 1.1 | 1.2 | 1.3 | \* | 1.05 | 1.18 | 1.28 | 1.48 | \* |
|  | 2005-06 | 47 | 2.6 | 2.6 | 2.7 | 2.8 | ns | 4.8 | 4.7 | 5.0 | 5.0 | ns | 1.19 | 1.20 | 1.28 | 1.27 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 62 | **3.1** | 3.9 | 4.6 | 5.4 | \* | **4.0** | 4.4 | 4.6 | 4.6 | ns | 1.16 | 1.22 | 1.32 | 1.39 | ns | 1.4 | **1.4** | 1.8 | 2.2 | \* | 1.5 | **1.5** | 1.7 | 1.7 | \* | 0.98 | 1.00 | 1.17 | 1.24 | ns |
|  |  | 75 | 3.7 | **4.5** | 6.7 | 7.2 | \* | 3.1 | **3.5** | 3.9 | 4.2 | \* | 0.84 | 1.01 | 1.22 | 1.36 | \* | 4.3 | 4.4 | 4.9 | 5.7 | ns | 1.2 | 1.3 | 1.4 | 1.6 | ns | 0.88 | 0.90 | 1.05 | 1.12 | ns |
|  |  | 91 | 3.7 | **5.0** | 7.0 | 7.3 | \* | 2.8 | **3.4** | 3.6 | 3.9 | \* | 0.77 | 1.01 | 1.16 | 1.26 | \* | 7.3 | **7.4** | 8.1 | 9.1 | ns | 1.0 | **1.0** | 1.2 | 1.4 | \* | 0.95 | 0.96 | 1.14 | 1.27 | \* |
|  |  | 105 | 3.2 | 4.9 | 6.2 | 7.0 | \* | 1.9 | 2.2 | 2.7 | 2.8 | \* | 0.50 | 0.64 | 0.83 | 0.89 | \* | 13.4 | **14.5** | 16.1 | 17.4 | \* | 0.8 | **0.8** | 0.9 | 1.0 | ns | 0.85 | 0.87 | 1.09 | 1.29 | ns |
|  | 2006-07 | 45 | **1.1** | 1.7 | 2.0 | 2.4 | \* | **4.7** | 4.8 | 5.1 | 5.3 | ns | 0.97 | 1.09 | 1.20 | 1.32 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 58 | 4.2 | 4.5 | 4.6 | 5.4 | ns | 4.0 | 4.5 | 4.5 | 4.6 | ns | 1.17 | 1.28 | 1.30 | 1.38 | \* | 0.2 | 0.3 | 0.4 | 0.4 | ns | 1.7 | 1.7 | 1.8 | 1.9 | ns | 0.77 | 0.85 | 0.93 | 0.97 | ns |
|  |  | 74 | **4.5** | 4.8 | 5.2 | 6.2 | \* | **3.4** | 3.8 | 3.9 | 4.2 | ns | 0.96 | 1.11 | 1.17 | 1.29 | \* | 2.6 | 2.6 | 2.8 | 3.0 | ns | 1.5 | 1.6 | 1.8 | 1.8 | ns | 1.05 | 1.13 | 1.28 | 1.33 | ns |
|  |  | 95 | 4.1 | 4.8 | **5.2** | 6.1 | \* | 2.6 | 3.1 | **3.4** | 3.7 | \* | 0.72 | 0.90 | 1.00 | 1.15 | \* | 8.4 | 8.7 | 8.7 | 9.1 | ns | 1.3 | 1.5 | 1.8 | 1.8 | ns | 1.00 | 1.36 | 1.50 | 1.61 | ns |
|  |  | 116 | 3.1 | 3.4 | 3.6 | 5.1 | \* | 2.2 | 2.4 | 2.7 | 3.1 | ns | 0.58 | 0.64 | 0.72 | 0.91 | \* | 11.7 | 12.0 | 13.2 | 13.4 | ns | 1.2 | 1.3 | 1.7 | 1.7 | \* | 1.21 | 1.38 | 1.82 | 1.86 | \* |
| Gem Russet | 2003-04 | 45 | 0.6 | 0.9 | 0.9 | 0.8 | ns | 3.8 | 4.3 | 4.7 | 4.8 | \* | 0.65 | 0.80 | 0.86 | 0.88 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 60 | **5.8** | 7.3 | 8.2 | 9.4 | \* | **3.6** | 4.0 | 4.0 | 4.1 | Ns | 1.05 | 1.17 | 1.23 | 1.26 | \* | 1.4 | 3.0 | **4.8** | 5.1 | \* | 1.3 | 1.3 | **1.4** | 1.7 | \* | 0.72 | 0.85 | 1.00 | 1.24 | \* |
|  |  | 75 | 8.2 | **9.8** | 11.1 | 12.2 | \* | 2.5 | **3.1** | 3.6 | 3.7 | \* | 0.81 | 1.20 | 1.24 | 1.28 | \* | 5.5 | **8.0** | 8.5 | 9.2 | \* | 1.2 | **1.2** | 1.4 | 1.6 | \* | 0.89 | 0.97 | 1.16 | 1.30 | \* |
|  |  | 90 | 10.5 | **12.0** | 14.0 | 15.0 | \* | 2.1 | **3.0** | 3.0 | 3.1 | ns | 0.67 | 0.92 | 1.01 | 1.08 | ns | 7.5 | 9.0 | **9.6** | 11.3 | \* | 0.8 | 1.0 | **1.2** | 1.2 | \* | 0.75 | 0.95 | 0.97 | 1.02 | \* |
|  |  | 110 | 6.3 | 8.3 | 9.3 | 9.9 | \* | 2.1 | 2.4 | 2.8 | 3.1 | \* | 0.60 | 0.74 | 0.87 | 0.93 | \* | 12.0 | 13.0 | 15.0 | 16.0 | ns | 0.8 | 1.0 | 1.1 | 1.2 | \* | 0.71 | 0.93 | 1.02 | 1.12 | \* |
|  | 2004-05 | 55 | 1.7 | 1.9 | 2.2 | 2.2 | ns | 5.2 | 5.3 | 5.8 | 5.8 | ns | 1.12 | 1.21 | 1.27 | 1.31 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 61 | 3.6 | 3.8 | 4.2 | 4.9 | ns | 4.7 | 5.0 | 5.1 | 5.2 | ns | 1.18 | 1.27 | 1.32 | 1.40 | ns | 1.7 | **1.8** | 2.2 | 3.1 | \* | 1.4 | **1.7** | 2.0 | 2.0 | \* | 0.84 | 1.01 | 1.07 | 1.11 | \* |
|  |  | 83 | 5.6 | **8.8** | 8.9 | 8.9 | \* | 3.1 | **3.3** | 3.6 | 4.7 | \* | 0.87 | 1.06 | 1.10 | 1.46 | \* | 7.1 | 7.1 | **7.4** | 9.5 | \* | 0.7 | 0.9 | **1.2** | 1.5 | \* | 0.85 | 1.22 | 1.28 | 1.55 | \* |
|  |  | 110 | 3.7 | 4.3 | 5.5 | 9.4 | \* | 1.6 | 1.6 | 1.8 | 2.7 | \* | 0.40 | 0.43 | 0.51 | 0.85 | \* | 12.1 | 13.1 | 15.0 | 15.2 | ns | 0.9 | 0.9 | 1.3 | 1.5 | \* | 0.80 | 0.84 | 1.19 | 1.38 | \* |
|  | 2005-06 | 47 | **2.0** | 2.0 | 2.1 | 2.1 | ns | **4.6** | 5.2 | 5.6 | 5.6 | \* | 1.03 | 1.15 | 1.26 | 1.26 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 62 | 3.2 | **3.5** | 4.1 | 4.5 | \* | 4.0 | **4.1** | 4.3 | 5.1 | \* | 0.97 | 1.03 | 1.12 | 1.35 | ns | 0.6 | 0.7 | 0.8 | 1.4 | \* | 1.6 | 2.0 | 2.0 | 2.2 | \* | 0.76 | 0.98 | 1.04 | 1.24 | \* |
|  |  | 75 | **4.7** | 5.8 | 7.2 | 7.7 | \* | **3.9** | 4.2 | 4.2 | 5.2 | ns | 1.04 | 1.17 | 1.23 | 1.54 | \* | **2.8** | 3.3 | 4.1 | 4.4 | \* | **1.5** | 1.7 | 1.9 | 2.0 | ns | 0.99 | 1.17 | 1.34 | 1.41 | ns |
|  |  | 91 | **5.8** | 6.8 | 9.5 | 11.5 | \* | **3.6** | 3.8 | 4.4 | 5.1 | ns | 1.02 | 1.10 | 1.38 | 1.67 | \* | 6.9 | 7.2 | 8.3 | 10.0 | ns | 0.9 | 1.0 | 1.3 | 1.4 | ns | 0.73 | 0.79 | 1.04 | 1.22 | ns |
|  |  | 105 | 6.5 | 7.3 | 10.9 | 13.6 | \* | 2.7 | 2.8 | 3.6 | 4.0 | ns | 0.78 | 0.83 | 1.17 | 1.34 | ns | **11.5** | 14.6 | 15.7 | 16.6 | \* | **1.1** | 1.3 | 1.5 | 1.5 | \* | 0.99 | 1.15 | 1.35 | 1.41 | \* |
|  | 2006-07 | 45 | 1.3 | 1.3 | 1.3 | 1.6 | ns | 5.1 | 5.2 | 5.2 | 5.5 | ns | 1.03 | 1.05 | 1.05 | 1.15 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 58 | 4.1 | 5.1 | 5.3 | 5.4 | ns | 5.1 | 5.2 | 5.5 | 5.7 | ns | 1.31 | 1.42 | 1.51 | 1.56 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 74 | 6.2 | 6.5 | 7.1 | 7.7 | ns | 4.1 | 4.3 | 4.8 | 5.1 | \* | 1.17 | 1.24 | 1.42 | 1.52 | \* | 1.3 | **1.4** | 1.7 | 2.4 | \* | 1.6 | **1.8** | 1.9 | 2.1 | \* | 0.88 | 1.03 | 1.16 | 1.34 | ns |
|  |  | 95 | 7.1 | **7.9** | 8.9 | 9.9 | \* | 3.2 | **3.3** | 4.1 | 4.3 | \* | 0.93 | 0.99 | 1.26 | 1.37 | ns | 7.2 | 7.5 | 7.6 | 9.3 | ns | 1.2 | 1.5 | 1.7 | 1.8 | \* | 0.98 | 1.20 | 1.33 | 1.49 | \* |
|  |  | 116 | 2.3 | 2.5 | 2.8 | 3.5 | ns | 2.7 | 3.0 | 3.1 | 3.5 | ns | 0.61 | 0.70 | 0.73 | 0.89 | ns | 9.7 | 11.1 | 11.4 | 11.4 | ns | 1.4 | 1.6 | 1.7 | 1.8 | \* | 1.16 | 1.42 | 1.49 | 1.58 | \* |
| Umatilla Russet | 2004-05 | 55 | **2.0** | 2.3 | 2.3 | 2.4 | ns | **4.5** | 4.8 | 5.1 | 5.4 | \* | 0.98 | 1.08 | 1.15 | 1.22 | \* | 0.7 | 0.7 | 0.8 | 1.0 | ns | 1.6 | 1.8 | 1.8 | 1.9 | ns | 0.91 | 1.06 | 1.07 | 1.15 | ns |
|  |  | 61 | 2.8 | **4.3** | 4.9 | 5.4 | \* | 4.0 | **4.1** | 4.6 | 4.8 | \* | 0.93 | 1.12 | 1.19 | 1.26 | \* | 1.5 | 1.7 | 2.5 | 2.7 | ns | 1.3 | 1.6 | 1.6 | 1.7 | \* | 0.85 | 1.09 | 1.20 | 1.28 | \* |
|  |  | 83 | 5.3 | **8.3** | 9.6 | 13.0 | \* | 3.1 | **3.5** | 3.8 | 4.7 | \* | 0.82 | 0.90 | 1.11 | 1.44 | \* | 6.2 | **6.6** | 8.0 | 9.4 | \* | 0.9 | **1.2** | 1.3 | 1.3 | \* | 0.78 | 1.07 | 1.21 | 1.25 | \* |
|  |  | 110 | 2.2 | 5.4 | 7.3 | 7.6 | \* | 1.4 | 1.7 | 1.9 | 2.4 | \* | 0.31 | 0.45 | 0.52 | 0.67 | \* | 11.3 | 11.8 | **15.9** | 19.0 | \* | 0.7 | 0.9 | **1.1** | 1.1 | ns | 0.71 | 0.92 | 1.11 | 1.21 | ns |
|  | 2005-06 | 47 | 2.1 | 2.2 | 2.3 | 2.4 | ns | 5.0 | 5.5 | 5.3 | 5.4 | ns | 1.09 | 1.23 | 1.19 | 1.22 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 62 | 2.9 | **3.1** | 3.2 | 4.0 | \* | 4.0 | **4.2** | 4.4 | 5.0 | ns | 0.94 | 1.03 | 1.05 | 1.25 | ns | 0.8 | **1.0** | 1.2 | 2.5 | \* | 1.6 | **1.7** | 1.7 | 1.7 | ns | 0.92 | 1.01 | 1.06 | 1.24 | ns |
|  |  | 75 | 3.9 | 4.5 | **5.2** | 6.2 | \* | 3.0 | 3.2 | **3.8** | 4.6 | \* | 0.75 | 0.80 | 0.91 | 1.24 | \* | 4.4 | **5.3** | 5.5 | 5.5 | \* | 1.1 | **1.2** | 1.2 | 1.3 | ns | 0.83 | 0.99 | 0.99 | 1.07 | ns |
|  |  | 91 | 6.9 | 8.5 | **10.4** | 10.8 | \* | 3.3 | 3.3 | **3.4** | 4.3 | \* | 0.89 | 0.93 | 0.97 | 1.26 | \* | 9.2 | **9.5** | 10.2 | 10.9 | \* | 0.9 | **1.1** | 1.2 | 1.3 | \* | 0.87 | 0.98 | 1.12 | 1.23 | \* |
|  |  | 105 | 6.5 | 7.5 | 8.7 | 9.6 | \* | 2.4 | 2.6 | 2.8 | 2.8 | ns | 0.66 | 0.71 | 0.78 | 0.82 | ns | 13.9 | **14.1** | 14.1 | 16.6 | \* | 1.0 | **1.1** | 1.3 | 1.4 | \* | 0.92 | 1.01 | 1.21 | 1.37 | \* |
|  | 2006-07 | 45 | 1.2 | 1.4 | 1.5 | 1.8 | ns | 4.6 | 4.8 | 4.8 | 4.9 | ns | 0.91 | 0.99 | 1.01 | 1.05 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 58 | 3.3 | 4.7 | 5.6 | 5.9 | ns | 5.0 | 5.0 | 5.4 | 5.7 | ns | 1.19 | 1.28 | 1.42 | 1.50 | ns | 0.4 | 0.3 | 0.5 | 0.5 | ns | 2.4 | 2.5 | 2.5 | 2.9 | \* | 0.90 | 0.95 | 1.32 | 1.55 | ns |
|  |  | 74 | **6.7** | 8.2 | 8.4 | 9.1 | \* | **3.7** | 4.5 | 4.8 | 5.2 | \* | 1.02 | 1.26 | 1.37 | 1.49 | \* | 1.5 | 1.8 | 2.7 | 2.8 | ns | 1.9 | 1.9 | 2.0 | 2.0 | ns | 0.88 | 0.92 | 1.44 | 1.48 | ns |
|  |  | 95 | 4.9 | **8.1** | 8.2 | 8.6 | \* | 2.9 | **3.5** | 3.9 | 4.1 | \* | 0.75 | 0.93 | 1.10 | 1.17 | \* | 5.7 | 6.7 | 6.7 | 8.2 | ns | 1.5 | 1.5 | 1.7 | 1.7 | ns | 0.87 | 0.93 | 1.02 | 1.11 | ns |
|  |  | 116 | 3.2 | 3.8 | 5.2 | 6.2 | \* | 2.0 | 2.0 | 2.2 | 2.5 | ns | 0.47 | 0.49 | 0.57 | 0.68 | ns | 9.4 | 9.5 | 10.9 | 11.5 | ns | 1.3 | 1.4 | 1.6 | 1.7 | \* | 0.82 | 0.92 | 1.09 | 1.12 | \* |
| Bannock Russet | 2003-04 | 45 | 0.5 | 0.5 | 0.5 | 0.5 | ns | 4.9 | 4.9 | 5.4 | 5.7 | \* | 0.64 | 0.65 | 0.74 | 0.80 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 60 | 2.9 | **3.5** | 3.9 | 4.0 | \* | 4.4 | **4.4** | 4.5 | 4.7 | ns | 0.80 | 0.81 | 0.87 | 0.94 | ns | 0.2 | 0.3 | 0.5 | 0.6 | \* | 1.6 | 1.8 | 2.1 | 2.3 | ns | 0.75 | 0.90 | 1.17 | 1.33 | ns |
|  |  | 75 | 3.8 | 5.0 | **5.6** | 6.5 | \* | 3.5 | 3.8 | **4.0** | 4.7 | \* | 0.62 | 0.72 | 0.75 | 0.92 | \* | 0.7 | 1.1 | **1.2** | 1.2 | \* | 1.3 | 1.4 | **1.6** | 1.8 | \* | 0.76 | 0.91 | 1.03 | 1.16 | \* |
|  |  | 90 | 3.5 | 5.1 | 5.6 | **7.0** | \* | 3.4 | 3.7 | 3.8 | **3.9** | \* | 0.58 | 0.69 | 0.74 | 0.88 | \* | 1.1 | 1.5 | **2.5** | 4.5 | \* | 1.0 | 1.0 | **1.3** | 1.3 | \* | 0.73 | 0.80 | 0.95 | 1.06 | ns |
|  |  | 110 | 2.9 | 3.6 | 3.8 | 5.5 | \* | 3.1 | 3.4 | 3.7 | 3.9 | \* | 0.51 | 0.59 | 0.67 | 0.77 | \* | 3.8 | 5.1 | **5.5** | 5.8 | \* | 1.0 | 1.1 | **1.1** | 1.1 | ns | 0.80 | 0.90 | 0.94 | 0.95 | ns |
|  | 2004-05 | 55 | 1.9 | **2.2** | 2.4 | 2.7 | \* | 4.5 | **4.8** | 5.1 | 5.1 | \* | 0.97 | 1.13 | 1.15 | 1.20 | ns | 0.2 | 0.5 | 0.5 | 1.1 | ns | 2.2 | 2.4 | 3.0 | 3.1 | ns | 1.04 | 1.33 | 1.65 | 1.90 | ns |
|  |  | 61 | 3.5 | **4.5** | 4.8 | 5.1 | \* | 4.3 | **4.4** | 4.5 | 4.6 | ns | 1.06 | 1.12 | 1.16 | 1.22 | ns | 0.3 | 0.6 | 0.8 | 1.2 | \* | 2.3 | 2.4 | 2.4 | 2.9 | \* | 1.15 | 1.35 | 1.47 | 1.86 | \* |
|  |  | 83 | 4.4 | 8.6 | **12.1** | 13.0 | \* | 3.4 | 3.5 | **3.5** | 4.3 | \* | 0.86 | 1.02 | 1.12 | 1.34 | \* | 2.9 | 3.4 | **4.2** | 6.7 | \* | 1.0 | 1.1 | **1.2** | 1.8 | \* | 0.77 | 0.87 | 0.95 | 1.56 | \* |
|  |  | 110 | 4.5 | 5.8 | 5.8 | 8.5 | \* | 1.6 | 1.8 | 1.9 | 3.2 | \* | 0.42 | 0.48 | 0.52 | 0.91 | \* | **9.1** | 9.2 | 11.8 | 12.1 | \* | **1.1** | 1.2 | 1.2 | 1.3 | ns | 1.01 | 1.15 | 1.21 | 1.25 | ns |
|  | 2005-06 | 47 | 2.0 | 2.3 | 2.3 | 2.2 | ns | 4.8 | 4.9 | 5.0 | 5.3 | ns | 1.06 | 1.11 | 1.13 | 1.19 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 62 | 3.4 | **3.4** | 3.4 | 4.0 | \* | 4.3 | **4.5** | 4.7 | 5.3 | \* | 1.05 | 1.13 | 1.15 | 1.33 | \* | 0.5 | 0.8 | 0.9 | 1.0 | \* | 1.6 | 1.6 | 1.8 | 2.0 | ns | 0.89 | 0.97 | 1.11 | 1.25 | ns |
|  |  | 75 | 5.3 | **5.9** | 5.9 | 7.5 | \* | 4.0 | **4.1** | 4.3 | 4.8 | ns | 1.06 | 1.14 | 1.17 | 1.35 | ns | 2.3 | **2.8** | 3.0 | 5.3 | \* | 1.2 | **1.3** | 1.6 | 1.7 | \* | 0.90 | 0.98 | 1.19 | 1.44 | \* |
|  |  | 91 | 5.7 | **8.9** | 11.2 | 12.7 | \* | 3.7 | **3.8** | 4.0 | 4.2 | ns | 1.00 | 1.09 | 1.20 | 1.32 | ns | 7.3 | **9.3** | 12.4 | 13.0 | \* | 1.1 | **1.1** | 1.2 | 1.3 | ns | 0.97 | 1.02 | 1.17 | 1.25 | ns |
|  |  | 105 | 8.2 | 9.7 | 16.0 | 19.3 | \* | 2.6 | 3.0 | 3.6 | 4.3 | ns | 0.75 | 0.89 | 1.16 | 1.45 | ns | **12.6** | 15.0 | 16.7 | 16.8 | \* | **1.0** | 1.3 | 1.3 | 1.8 | \* | 0.99 | 1.36 | 1.41 | 1.84 | \* |
| Markies Russet | 2004-05 | 55 | 3.4 | 3.7 | 4.0 | 4.2 | ns | 4.9 | 5.0 | 5.2 | 5.5 | ns | 1.13 | 1.19 | 1.27 | 1.34 | ns | 0.1 | 0.1 | 0.2 | 0.2 | ns | 2.6 | 3.0 | 3.1 | 3.1 | ns | 0.90 | 1.05 | 1.21 | 1.24 | \* |
|  |  | 61 | **4.9** | 5.4 | 6.8 | 7.1 | \* | **3.9** | 4.3 | 4.6 | 4.6 | \* | 0.96 | 1.12 | 1.26 | 1.28 | \* | 0.7 | 0.7 | **1.1** | 1.6 | \* | 1.8 | 2.0 | **2.0** | 2.1 | ns | 0.85 | 0.94 | 1.03 | 1.17 | ns |
|  |  | 83 | 6.6 | 7.3 | **7.9** | 10.6 | \* | 3.3 | 3.5 | **3.8** | 4.0 | ns | 0.91 | 0.99 | 1.06 | 1.21 | ns | **3.5** | 4.0 | 5.6 | 5.9 | \* | **1.5** | 1.6 | 1.8 | 1.9 | \* | 0.96 | 1.05 | 1.26 | 1.34 | \* |
|  |  | 110 | 4.1 | 6.6 | 9.3 | **10.3** | \* | 2.5 | 2.9 | 3.0 | **3.2** | ns | 0.62 | 0.79 | 0.89 | 0.99 | ns | **7.0** | 7.0 | 7.5 | 7.8 | \* | **1.4** | 1.5 | 1.7 | 1.7 | \* | 0.98 | 1.11 | 1.25 | 1.27 | ns |
|  | 2005-06 | 47 | 1.7 | 1.8 | 1.9 | 1.9 | \* | 5.0 | 5.6 | 5.6 | 5.6 | \* | 1.09 | 1.11 | 1.13 | 1.20 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 62 | 3.4 | 3.5 | 3.9 | 4.0 | ns | 4.8 | 4.9 | 5.0 | 5.1 | ns | 1.11 | 1.14 | 1.20 | 1.23 | ns | 0.7 | 0.7 | 0.8 | 1.3 | \* | 1.6 | 2.0 | 2.0 | 2.2 | ns | 0.76 | 0.95 | 0.99 | 1.17 | ns |
|  |  | 75 | **5.1** | 5.2 | 6.4 | 8.0 | \* | **3.9** | 4.2 | 4.2 | 4.5 | \* | 1.01 | 1.08 | 1.14 | 1.29 | ns | 2.9 | 3.0 | 3.1 | 3.6 | ns | 1.6 | 1.7 | 1.9 | 2.0 | ns | 0.97 | 1.08 | 1.19 | 1.26 | ns |
|  |  | 91 | 6.9 | **7.9** | 8.7 | 10.5 | \* | 3.4 | **3.6** | 4.1 | 4.3 | \* | 0.94 | 1.07 | 1.18 | 1.30 | \* | 6.0 | 6.3 | **7.8** | 9.0 | \* | 1.1 | 1.3 | **1.4** | 1.5 | \* | 0.81 | 0.90 | 1.04 | 1.14 | \* |
|  |  | 105 | 6.4 | 10.4 | **12.5** | 12.8 | \* | 2.6 | 3.0 | **3.2** | 3.5 | ns | 0.71 | 0.91 | 0.97 | 1.12 | \* | 7.8 | 8.7 | **10.8** | 10.9 | \* | 0.9 | 1.0 | **1.3** | 1.3 | \* | 0.69 | 0.76 | 1.02 | 1.03 | \* |

\* indicates a significant (*P* < 0.05) difference between N fertilization rates within a sampling date; ns: non significant.

**Appendix B:** Potato shoot biomass (Wsh), shoot N concentration (Nsh), shoot N nutrition index (NNIsh), tuber biomass (Wt), tuber N concentration (Nt), and tuber N nutrition index (NNIt) on different sampling dates at four Canadian locations for the cultivars Shepody and Russet Burbank grown under three or four N fertilization rates. Data points used for the critical N dilution curves are highlighted in bold. DAP, days after planting.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Wsh | | | |  | Nsh | | |  |  | NNIsh | | |  |  | Wt | | |  |  | Nt | | | |  | NNIt | | | |  |
|  |  | (Mg DM ha-1) | | | | |  | (g 100 g-1 DM) | | | |  |  | | |  |  | (Mg DM ha-1) | | |  |  | (g 100 g-1 DM) | | | |  |  |  |  |  |  |
|  |  | DAP | 0 | 50 | 100 | 250 |  | 0 | 50 | 100 | 250 |  | 0 | 50 | 100 | 250 |  | 0 | 50 | 100 | 250 |  | 0 | 50 | 100 | 250 |  | 0 | 50 | 100 | 250 |  |
| Shepody | Jacksonville | 44 | 0.2 | 0.4 | - | 0.3 | \* | 5.6 | 6.4 | - | 6.5 | \* | 0.70 | 0.90 | - | 0.88 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 50 | 0.7 | 0.8 | - | 1.1 | ns | 4.7 | 6.0 | - | 6.0 | \* | 0.78 | 1.03 | - | 1.14 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 57 | 1.3 | 1.4 | - | 1.8 | ns | 4.1 | 5.3 | - | 5.8 | \* | 0.82 | 1.07 | - | 1.25 | \* | 0.5 | 0.2 | - | 0.2 | \* | 1.6 | 1.9 | - | 1.9 | ns | 0.87 | 0.82 | - | 0.81 | ns |
|  |  | 64 | 1.3 | 2.1 | - | 1.9 | ns | 4.5 | 4.8 | - | 5.3 | ns | 0.89 | 1.08 | - | 1.17 | \* | 0.7 | **1.0** | - | 0.8 | \* | 1.4 | **1.6** | - | 1.8 | ns | 0.80 | 0.98 | - | 1.01 | ns |
|  |  | 74 | 2.3 | **3.6** | - | 4.9 | \* | 3.4 | **3.9** | - | 4.6 | ns | 0.79 | 1.06 | - | 1.33 | \* | 2.4 | **3.2** | - | 2.7 | \* | 1.2 | **1.3** | - | 1.6 | \* | 0.88 | 1.00 | - | 1.18 | \* |
|  |  | 81 | 2.0 | **2.8** | - | 4.9 | \* | 2.9 | **3.8** | - | 4.4 | \* | 0.65 | 0.93 | - | 1.25 | \* | 2.6 | **2.7** | - | 3.2 | \* | 1.2 | **1.4** | - | 1.5 | ns | 0.90 | 1.07 | - | 1.13 | \* |
|  |  | 87 | 2.7 | **4.1** | - | 4.3 | \* | 3.1 | **3.8** | - | 4.5 | \* | 0.74 | 1.05 | - | 1.26 | \* | 4.3 | 4.9 | - | 3.9 | ns | 1.0 | 1.2 | - | 1.5 | \* | 0.84 | 1.01 | - | 1.19 | ns |
|  |  | 94 | 2.5 | **4.8** | - | 6.6 | \* | 2.6 | **3.6** | - | 4.0 | \* | 0.62 | 0.91 | - | 1.24 | \* | 4.8 | 7.5 | - | 6.5 | \* | 1.1 | 1.4 | - | 1.4 | \* | 0.88 | 1.26 | - | 1.26 | \* |
|  |  | 107 | 2.5 | 2.6 | - | 3.9 | \* | 2.1 | 2.5 | - | 3.2 | \* | 0.50 | 0.63 | - | 0.85 | ns | 6.9 | 6.4 | - | 6.1 | ns | 1.0 | 1.3 | - | 1.8 | \* | 0.91 | 1.16 | - | 1.60 | \* |
|  |  | 114 | 2.1 | 3.1 | - | 4.2 | ns | 1.9 | 2.1 | - | 3.2 | \* | 0.43 | 0.51 | - | 0.88 | \* | 6.4 | 8.1 | - | 8.3 | ns | 0.9 | 1.1 | - | 1.6 | \* | 0.82 | 1.00 | - | 1.52 | \* |
|  | London | 41 | 0.3 | 0.4 | - | 0.3 | ns | 5.0 | 6.1 | - | 6.6 | \* | 0.64 | 0.84 | - | 0.90 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 49 | 0.6 | 0.8 | - | 1.0 | \* | 4.5 | 5.7 | - | 5.8 | \* | 0.70 | 0.98 | - | 1.08 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 56 | 0.8 | **1.4** | - | 2.3 | \* | 3.9 | **5.0** | - | 5.1 | \* | 0.66 | 1.17 | - | 1.13 | \* | 0.1 | 0.8 | - | 0.3 | \* | 1.7 | 1.7 | - | 1.8 | ns | 0.66 | 1.00 | - | 0.88 | \* |
|  |  | 59 | 1.5 | **1.8** | - | 2.2 | \* | 3.5 | **4.8** | - | 5.5 | \* | 0.73 | 1.09 | - | 1.25 | \* | 0.5 | 0.6 | - | 0.7 | \* | 1.3 | 1.8 | - | 1.6 | \* | 0.69 | 1.01 | - | 0.93 | \* |
|  |  | 68 | 1.6 | **2.8** | - | 2.5 | \* | 2.8 | **4.2** | - | 5.4 | \* | 0.59 | 1.14 | - | 1.27 | \* | 1.6 | 2.0 | - | 1.3 | ns | 1.0 | 1.5 | - | 1.6 | \* | 0.69 | 1.05 | - | 1.00 | \* |
|  |  | 73 | 1.2 | **2.5** | - | 3.7 | \* | 2.4 | **4.1** | - | 5.0 | \* | 0.46 | 0.97 | - | 1.31 | \* | 1.8 | **3.2** | - | 3.0 | \* | 0.9 | **1.3** | - | 1.4 | \* | 0.52 | 1.01 | - | 1.04 | \* |
|  |  | 80 | 1.9 | 3.7 | - | 4.8 | ns | 2.2 | 3.4 | - | 4.7 | \* | 0.48 | 0.91 | - | 1.34 | \* | 3.7 | **4.9** | - | 5.7 | ns | 0.7 | **1.2** | - | 1.5 | \* | 0.52 | 0.98 | - | 1.27 | \* |
|  |  | 97 | 2.9 | 2.5 | - | 3.6 | ns | 1.9 | 2.1 | - | 3.1 | \* | 0.42 | 0.47 | - | 0.81 | \* | 7.6 | 6.6 | - | 8.3 | ns | 0.9 | 1.0 | - | 1.4 | ns | 0.79 | 0.93 | - | 1.30 | ns |
|  |  | 104 | 1.2 | 3.2 | - | 4.6 | \* | 1.6 | 2.5 | - | 3.0 | \* | 0.31 | 0.63 | - | 0.85 | \* | 5.2 | **8.8** | - | 10.7 | \* | 0.7 | **1.1** | - | 1.7 | \* | 0.56 | 1.02 | - | 1.65 | \* |
|  |  | 110 | 1.2 | 3.2 | - | 3.2 | \* | 1.5 | 2.0 | - | 2.8 | \* | 0.30 | 0.49 | - | 0.71 | \* | 6.4 | **12.0** | - | 9.4 | \* | 0.8 | **1.0** | - | 1.5 | \* | 0.70 | 1.27 | - | 1.46 | \* |
|  | Hartland | 40 | 0.3 | 0.2 | 0.3 | 0.3 | ns | 5.2 | 6.0 | 5.9 | 6.3 | \* | 0.67 | 0.69 | 0.78 | 0.79 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 49 | 0.6 | 0.4 | 0.7 | 0.4 | ns | 4.7 | 5.7 | 5.8 | 5.9 | \* | 0.73 | 0.79 | 0.92 | 0.86 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 54 | 0.7 | 0.9 | 1.2 | 1.1 | ns | 4.5 | 5.3 | 5.5 | 5.6 | \* | 0.73 | 0.90 | 1.06 | 1.05 | ns | 0.2 | 0.3 | 0.2 | 0.2 | ns | 2.1 | 1.9 | 2.2 | 2.2 | ns | 0.92 | 0.93 | 0.94 | 0.92 | ns |
|  |  | 61 | 1.5 | 1.5 | 1.6 | 1.7 | ns | 4.5 | 5.3 | 5.8 | 6.1 | \* | 0.93 | 1.07 | 1.19 | 1.26 | ns | 1.8 | 1.7 | 1.5 | 1.0 | ns | 1.3 | 1.6 | 1.6 | 1.5 | ns | 0.87 | 1.06 | 1.04 | 0.94 | ns |
|  |  | 69 | 1.9 | 2.0 | 2.4 | 2.3 | ns | 3.9 | 4.4 | 5.4 | 5.6 | \* | 0.84 | 0.97 | 1.25 | 1.26 | \* | 1.9 | 2.4 | **2.5** | 3.1 | \* | 1.0 | 1.3 | **1.4** | 1.4 | \* | 0.73 | 0.92 | 1.00 | 0.94 | \* |
|  |  | 74 | 1.2 | **1.7** | 3.5 | 2.5 | \* | 3.4 | **4.5** | 4.7 | 5.5 | \* | 0.66 | 0.95 | 1.21 | 1.29 | \* | 2.2 | 3.1 | **4.3** | 4.5 | \* | 1.0 | 1.2 | **1.2** | 1.4 | \* | 0.79 | 0.84 | 0.97 | 1.05 | \* |
|  |  | 81 | 2.0 | 2.3 | 2.5 | 3.2 | ns | 3.5 | 3.8 | 4.1 | 4.7 | \* | 0.76 | 0.87 | 0.97 | 1.16 | \* | 3.6 | 5.0 | 3.9 | 4.7 | ns | 1.0 | 1.1 | 1.1 | 1.4 | \* | 0.83 | 0.90 | 0.91 | 1.15 | \* |
|  |  | 90 | 1.4 | 2.1 | 3.2 | 2.7 | \* | 2.5 | 2.8 | 3.2 | 4.0 | \* | 0.49 | 0.62 | 0.79 | 0.96 | \* | 4.7 | **6.9** | 7.4 | 5.8 | \* | 0.9 | **1.1** | 1.3 | 1.5 | \* | 0.72 | 0.98 | 1.22 | 1.30 | \* |
|  |  | 98 | 1.0 | 1.6 | 1.6 | 2.7 | \* | 2.2 | 2.5 | 2.8 | 3.5 | \* | 0.39 | 0.53 | 0.59 | 0.85 | \* | 4.9 | **6.3** | 6.6 | 8.6 | \* | 0.8 | **1.2** | 1.2 | 1.6 | \* | 0.70 | 1.06 | 1.08 | 1.45 | \* |
|  | Drummond | 32 | 0.1 | 0.2 | 0.2 | 0.2 | ns | 6.6 | 7.0 | 7.1 | 7.1 | \* | 0.71 | 0.78 | 0.79 | 0.82 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 39 | 0.5 | 0.5 | 0.6 | 0.5 | ns | 5.6 | 6.1 | 6.1 | 6.4 | \* | 0.84 | 0.93 | 0.96 | 0.92 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 46 | 1.2 | 1.1 | 1.3 | 1.2 | ns | 5.5 | 6.1 | 6.3 | 6.3 | \* | 1.04 | 1.16 | 1.21 | 1.22 | ns | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 53 | 1.3 | 1.7 | 1.9 | 1.9 | ns | 4.4 | 4.9 | 5.5 | 5.7 | \* | 0.86 | 1.03 | 1.20 | 1.23 | \* | 0.5 | 0.4 | 0.3 | 0.2 | ns | 1.7 | 1.8 | 2.2 | 2.3 | ns | 0.89 | 0.94 | 1.07 | 1.06 | ns |
|  |  | 63 | 1.7 | **3.0** | 3.4 | 3.5 | \* | 3.4 | **4.2** | 4.8 | 5.5 | \* | 0.71 | 1.03 | 1.22 | 1.41 | \* | 1.5 | 2.2 | 2.1 | 2.1 | ns | 1.1 | 1.4 | 1.5 | 1.6 | \* | 0.71 | 1.01 | 1.07 | 1.47 | \* |
|  |  | 69 | 2.0 | 3.0 | 3.3 | 2.7 | ns | 3.5 | 4.0 | 4.4 | 5.4 | \* | 0.76 | 0.99 | 1.11 | 1.30 | \* | 3.5 | 4.1 | 4.0 | 2.6 | ns | 0.9 | 1.3 | 1.4 | 1.7 | \* | 0.73 | 1.06 | 1.16 | 1.23 | \* |
|  |  | 76 | 2.4 | 2.7 | 3.0 | 2.5 | ns | 2.8 | 3.3 | 4.2 | 5.0 | \* | 0.66 | 0.79 | 1.02 | 1.19 | \* | 4.9 | 4.6 | 3.3 | 2.7 | ns | 1.0 | 1.3 | 1.6 | 1.7 | \* | 0.84 | 1.06 | 1.22 | 1.30 | \* |
|  |  | 83 | 2.7 | 3.7 | 3.7 | 5.3 | ns | 2.7 | 2.9 | 3.4 | 4.6 | \* | 0.65 | 0.75 | 0.88 | 1.32 | \* | 6.7 | 6.8 | 7.7 | 8.2 | ns | 0.9 | 1.2 | 1.2 | 1.4 | \* | 0.77 | 1.05 | 1.08 | 1.30 | \* |
|  |  | 88 | 2.0 | 2.4 | 3.2 | 3.8 | \* | 2.3 | 2.6 | 2.8 | 4.4 | \* | 0.51 | 0.59 | 0.69 | 1.16 | \* | 7.5 | 7.4 | 8.3 | 7.5 | ns | 0.8 | 1.1 | 1.4 | 1.4 | \* | 0.71 | 1.02 | 1.28 | 1.29 | \* |
|  |  | 95 | 1.7 | 2.9 | 3.5 | 3.2 | \* | 2.2 | 2.3 | 2.7 | 4.2 | \* | 0.46 | 0.57 | 0.69 | 1.04 | \* | 5.6 | **8.2** | 11.9 | 10.1 | \* | 1.0 | **1.1** | 1.5 | 2.0 | \* | 0.90 | 1.27 | 1.53 | 1.90 | \* |
| R.Burbank | Jacksonville | 44 | 0.3 | 0.3 | - | 0.4 | ns | 4.7 | 5.7 | - | 6.1 | \* | 0.65 | 0.83 | - | 0.91 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 50 | 0.6 | 0.8 | - | 0.7 | ns | 4.3 | 5.3 | - | 5.9 | \* | 0.74 | 0.99 | - | 1.07 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 57 | 0.8 | **1.1** | - | 1.5 | \* | 4.1 | **4.9** | - | 5.2 | \* | 0.78 | 1.03 | - | 1.14 | \* | 0.6 | 0.5 | - | 0.2 | ns | 1.4 | 1.7 | - | 2.1 | \* | 0.74 | 0.89 | - | 0.92 | \* |
|  |  | 64 | 1.0 | 1.6 | - | **1.4** | \* | 3.7 | 4.4 | - | **4.9** | \* | 0.73 | 1.00 | - | 1.07 | \* | 0.7 | 1.2 | - | 0.8 | ns | 1.3 | 1.6 | - | 1.7 | \* | 0.81 | 1.02 | - | 1.00 | \* |
|  |  | 74 | 1.7 | **2.6** | - | 3.0 | \* | 3.1 | **4.0** | - | 4.3 | \* | 0.70 | 1.02 | - | 1.15 | \* | 2.2 | 2.0 | - | 2.2 | ns | 1.2 | 1.4 | - | 1.5 | \* | 0.85 | 1.03 | - | 1.14 | \* |
|  |  | 81 | 2.0 | **2.7** | - | 3.1 | \* | 3.0 | **3.7** | - | 4.0 | \* | 0.72 | 0.94 | - | 1.09 | \* | 3.1 | 3.4 | - | 2.6 | ns | 1.1 | 1.3 | - | 1.5 | \* | 0.88 | 1.05 | - | 1.15 | ns |
|  |  | 87 | 1.8 | **3.0** | - | 3.3 | \* | 3.2 | **3.6** | - | 3.9 | \* | 0.74 | 0.94 | - | 1.09 | \* | 3.3 | 4.5 | - | **3.9** | \* | 1.0 | 1.3 | - | **1.3** | ns | 0.81 | 1.08 | - | 1.07 | ns |
|  |  | 94 | 3.4 | 2.9 | - | 4.0 | ns | 2.7 | 2.9 | - | 3.6 | ns | 0.75 | 0.76 | - | 1.05 | ns | 5.5 | 5.5 | - | 4.7 | ns | 1.1 | 1.4 | - | 1.5 | ns | 0.94 | 1.26 | - | 1.33 | ns |
|  |  | 107 | 2.8 | 5 | - | 3.4 | ns | 2.4 | 2.3 | - | 3.1 | ns | 0.62 | 0.72 | - | 0.87 | ns | 7.8 | 6.1 | - | 6.8 | ns | 1.1 | 1.2 | - | 1.5 | \* | 0.96 | 1.17 | - | 1.30 | \* |
|  |  | 114 | 2.9 | 3.4 | - | 3.8 | \* | 2.1 | 3.0 | - | 3.3 | \* | 0.55 | 0.82 | - | 0.93 | \* | **8.0** | 9.6 | - | 6.4 | \* | **1.0** | 1.2 | - | 1.7 | \* | 0.94 | 1.00 | - | 1.40 | \* |
|  | London | 41 | 0.2 | 2.4 | - | 0.3 | ns | 4.9 | 2.4 | - | 6.1 | \* | 0.62 | 0.61 | - | 0.86 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 49 | 0.6 | 0.4 | - | 0.9 | \* | 4.5 | 5.7 | - | 5.2 | ns | 0.77 | 0.89 | - | 1.01 | \* | 0.1 | 0.1 | - | 0.2 | \* | 2.4 | 2.4 | - | 2.4 | ns | 0.83 | 0.89 | - | 1.01 | ns |
|  |  | 56 | 1.3 | 0.9 | - | 1.3 | ns | 3.4 | 5.4 | - | 5.4 | \* | 0.71 | 1.01 | - | 1.15 | \* | 0.7 | 0.1 | - | 0.7 | ns | 1.5 | 2.4 | - | 1.9 | ns | 0.81 | 1.12 | - | 1.06 | ns |
|  |  | 59 | 1.3 | 1.8 | - | 1.7 | ns | 3.8 | 5.1 | - | 5.2 | \* | 0.80 | 1.17 | - | 1.19 | \* | 0.5 | 0.9 | - | **1.1** | \* | 1.6 | 1.9 | - | **1.7** | ns | 0.74 | 1.14 | - | 1.06 | \* |
|  |  | 68 | 1.6 | 2.2 | - | 3.1 | ns | 2.8 | 4.8 | - | 4.9 | \* | 0.63 | 1.17 | - | 1.33 | \* | 2.0 | 1.4 | - | **2.2** | \* | 1.0 | 1.7 | - | **1.5** | \* | 0.69 | 1.21 | - | 1.04 | \* |
|  |  | 73 | 1.4 | **2.5** | - | 2.8 | \* | 2.2 | **4.0** | - | 4.2 | \* | 0.49 | 1.07 | - | 1.10 | \* | 2.2 | 2.2 | - | 3.3 | ns | 0.9 | 1.4 | - | 1.4 | \* | 0.61 | 0.94 | - | 1.06 | \* |
|  |  | 80 | 1.7 | 2.9 | - | **3.3** | \* | 1.6 | 3.6 | - | **3.7** | \* | 0.37 | 0.94 | - | 1.02 | \* | 6.7 | **3.7** | - | 4.1 | \* | 0.8 | **1.3** | - | 1.3 | \* | 0.60 | 1.12 | - | 1.08 | \* |
|  |  | 81 | 2.0 | 3.2 | - | **4.4** | \* | 2.3 | 3.3 | - | **3.4** | \* | 0.55 | 0.91 | - | 0.99 | \* | 3.8 | **4.8** | - | 7.5 | \* | 0.9 | **1.2** | - | 1.4 | ns | 0.67 | 0.59 | - | 1.24 | \* |
|  |  | 97 | 1.7 | 2.7 | - | 3.4 | \* | 1.7 | 2.1 | - | 3.2 | \* | 0.39 | 0.55 | - | 0.89 | \* | 6.0 | 7.1 | - | 6.5 | ns | 0.7 | 1.1 | - | 1.6 | \* | 0.59 | 0.97 | - | 1.39 | \* |
|  |  | 104 | 1.3 | 3.1 | - | 3.1 | \* | 1.6 | 2.3 | - | 3.0 | \* | 0.34 | 0.61 | - | 0.83 | \* | 5.0 | **8.5** | - | 7.5 | \* | 0.7 | **1.1** | - | 1.5 | \* | 1.13 | 1.39 | - | 0.88 | \* |
|  | Hartland | 40 | 0.2 | 0.3 | 0.3 | 0.3 | ns | 4.9 | 5.2 | 5.4 | 5.6 | \* | 0.64 | 0.72 | 0.74 | 0.76 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 49 | 0.6 | 0.7 | 0.8 | 0.5 | ns | 4.5 | 5.0 | 5.3 | 5.5 | \* | 0.76 | 0.91 | 1.00 | 0.91 | ns | 0.1 | 0.2 | 0.1 | 0.0 | ns | 1.9 | 2.1 | 2.5 | 2.7 | \* | 0.83 | 0.94 | 1.05 | 0.90 | \* |
|  |  | 54 | 0.7 | **1.0** | 1.1 | 1.0 | \* | 4.3 | **4.9** | 5.2 | 5.6 | \* | 0.78 | 0.97 | 1.06 | 1.12 | \* | 0.3 | 0.5 | 0.4 | 0.3 | ns | 1.8 | 1.9 | 2.1 | 2.1 | \* | 0.85 | 1.02 | 1.10 | 1.06 | \* |
|  |  | 61 | 1.2 | 1.6 | 1.8 | 1.5 | ns | 4.3 | 5.1 | 5.4 | 5.7 | \* | 0.89 | 1.17 | 1.26 | 1.25 | \* | 1.4 | 1.6 | **1.6** | 2.1 | \* | 1.2 | 1.6 | **1.5** | 1.6 | \* | 0.79 | 1.06 | 1.00 | 1.14 | \* |
|  |  | 69 | 1.2 | **1.9** | 2.3 | 2.2 | \* | 3.3 | **4.3** | 4.6 | 4.8 | \* | 0.68 | 1.02 | 1.14 | 1.16 | \* | 2.4 | **2.5** | 3.2 | 3.0 | \* | 1.0 | **1.4** | 1.4 | 1.4 | \* | 0.76 | 1.08 | 1.02 | 1.06 | \* |
|  |  | 74 | 1.1 | **2.6** | 3.3 | 2.7 | \* | 3.5 | **3.8** | 4.5 | 5.1 | \* | 0.69 | 0.97 | 1.25 | 1.33 | \* | 3.0 | 3.8 | 4.3 | 3.6 | ns | 0.8 | 1.0 | 1.2 | 1.2 | \* | 0.66 | 0.81 | 0.99 | 0.99 | \* |
|  |  | 81 | 2.0 | **3.2** | 3.8 | 3.9 | \* | 2.7 | **3.4** | 3.6 | 4.6 | \* | 0.64 | 0.94 | 1.05 | 1.34 | \* | 4.8 | 5.3 | 5.8 | 5.5 | ns | 0.8 | 1.1 | 1.3 | 1.3 | \* | 0.72 | 0.98 | 1.14 | 1.13 | \* |
|  |  | 90 | 1.9 | 2.6 | 2.9 | 3.5 | \* | 2.3 | 2.5 | 3.0 | 4.1 | \* | 0.55 | 0.65 | 0.80 | 1.16 | \* | 6.1 | 6.2 | 6.0 | 6.4 | ns | 0.9 | 1.1 | 1.1 | 1.4 | \* | 0.74 | 0.98 | 0.93 | 1.21 | \* |
|  |  | 98 | 1.5 | 2.4 | 2.7 | 2.6 | ns | 2.0 | 2.7 | 2.9 | 3.5 | \* | 0.44 | 0.67 | 0.76 | 0.89 | \* | 5.9 | 8.6 | **7.0** | 7.7 | \* | 1.0 | 1.1 | **1.1** | 1.1 | ns | 0.85 | 1.01 | 0.97 | 0.97 | ns |
|  | Drummond | 39 | 0.4 | 0.3 | 0.4 | 0.3 | ns | 5.1 | 5.8 | 5.8 | 6.1 | \* | 0.75 | 0.84 | 0.89 | 0.86 | \* | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  |  | 46 | 0.8 | 0.8 | 0.9 | 0.5 | \* | 4.6 | 5.7 | 5.6 | 6.0 | \* | 0.87 | 1.08 | 1.07 | 0.99 | ns | 0.1 | 0.1 | 0.1 | 0.0 | ns | 2.0 | 2.5 | 2.6 | 3.0 | \* | 0.86 | 0.89 | 0.95 | 0.89 | \* |
|  |  | 53 | 0.8 | 1.1 | 1.2 | 1.2 | ns | 4.7 | 5.0 | 5.4 | 5.4 | \* | 0.89 | 1.04 | 1.11 | 1.13 | \* | 0.4 | 0.5 | 0.6 | 0.5 | ns | 1.5 | 1.8 | 2.1 | 2.1 | ns | 0.79 | 1.02 | 1.21 | 1.17 | \* |
|  |  | 63 | 1.6 | 1.7 | 1.8 | 1.8 | ns | 3.9 | 4.3 | 4.7 | 5.1 | \* | 0.88 | 0.99 | 1.09 | 1.15 | \* | **1.2** | 1.8 | 1.9 | 2.2 | \* | **1.1** | 1.3 | 1.7 | 1.7 | \* | 0.87 | 0.96 | 1.27 | 1.12 | \* |
|  |  | 69 | 2.1 | 2.7 | 2.9 | 2.6 | ns | 3.7 | 3.8 | 4.8 | 5.3 | \* | 0.91 | 0.98 | 1.30 | 1.38 | \* | 2.6 | 4.2 | **3.2** | 3.1 | \* | 1.1 | 1.1 | **1.4** | 1.4 | \* | 0.87 | 0.96 | 1.14 | 1.17 | \* |
|  |  | 76 | 2.6 | 2.9 | 3.3 | 3.9 | ns | 3.6 | 3.7 | 4.0 | 4.6 | ns | 0.95 | 1.00 | 1.12 | 1.33 | ns | 4.9 | 4.2 | 5.0 | 4.5 | ns | 1.0 | 1.2 | 1.3 | 1.3 | ns | 0.91 | 1.10 | 1.05 | 1.32 | ns |
|  |  | 83 | 2.5 | 2.7 | 3.6 | 2.7 | ns | 2.8 | 3.2 | 3.5 | 4.5 | \* | 0.71 | 0.82 | 1.00 | 1.16 | \* | 6.0 | 6.0 | **6.7** | 6.1 | \* | 0.8 | 1.0 | **1.1** | 1.4 | \* | 0.73 | 0.93 | 1.03 | 1.20 | \* |
|  |  | 88 | 2.0 | 2.8 | 2.5 | 4.0 | ns | 2.2 | 2.6 | 3.6 | 4.2 | \* | 0.53 | 0.69 | 0.92 | 1.25 | \* | 6.2 | 6.9 | 7.1 | 7.7 | ns | 0.7 | 0.9 | 1.1 | 1.2 | ns | 0.70 | 0.87 | 1.05 | 1.17 | ns |
|  |  | 95 | 1.8 | 2.2 | 2.9 | 3.2 | ns | 2.3 | 3.0 | 3.5 | 4.0 | \* | 0.54 | 0.74 | 0.92 | 1.10 | \* | 7.0 | 7.9 | 8.7 | 8.7 | ns | 1.0 | 1.1 | 1.5 | 1.6 | \* | 0.85 | 1.05 | 1.37 | 1.45 | \* |

\* indicates a significant (*P* < 0.05) difference between N fertilization rates within a sampling date; ns: non significant.