**Supplementary Table S1.** Chemical and physical properties of the soils (0‒10 and 10‒20 cm layers) from the Londrina and Ponta Grossa experimental sites

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Layer | pH(1) | SOC(2) | P(3) | K(3) | Al(4) | Ca(4) | Mg(4) | H+Al(5) | CEC(6) | V(7) | SBD(8) | Clay | Silt | Sand |
| (cm) |  | (%) | -(mg dm-3)- | | -----------------(cmolc dm-3)---------------- | | | | | (%) | (g cm-3) | -------(g kg-1)------- | | |
| *Londrina* | | | | | | | | | | | | | | |
| 0‒10 | 5.2 | 1.16 | 36.2 | 227 | 0.00 | 3.65 | 2.22 | 4.82 | 11.27 | 57.2 | 1.32 | 732 | 161 | 107 |
| 10‒20 | 5.2 | 1.15 | 31.3 | 257 | 0.01 | 3.78 | 2.28 | 4.98 | 11.70 | 57.3 | 1.31 | 762 | 146 | 92 |
| *Ponta Grossa* | | | | | | | | | | | | | | |
| 0‒10 | 4.6 | 1.85 | 11.2 | 121 | 0.16 | 2.84 | 0.99 | 5.72 | 9.85 | 42.0 | 1.29 | 526 | 77 | 397 |
| 10‒20 | 4.8 | 2.07 | 4.7 | 133 | 0.06 | 3.03 | 1.12 | 5.59 | 10.09 | 45.0 | 1.10 | 570 | 65 | 365 |

(1)pH in 0.01 mol L-1 CaCl2 (soil:solution ratio = 1:2.5). (2)Soil organic carbon (wet combustion ‒ Walkley-Black) on a gravimetric basis (w/w). (3)Available phosphorus and exchangeable potassium (Mehlich-1 extractant). (4)Exchangeable aluminium, calcium, and magnesium (1 mol L-1 KCl extractant). (5)Potential acidity (0.5 mol L-1 calcium acetate extractant at pH 7.0). (6)Cation exchange capacity. (7)Base saturation. (8)Soil bulk density. Data from soil sampling performed in November 2016.

**Supplementary Table S2.** Scoring system for visual evaluation of wheat plant lodging(1)

|  |  |  |
| --- | --- | --- |
| Score | Degrees of lodging | Lodging converted in percentage |
| 0 | Almost all plants upright | 0% |
| 1 | From 1% to 15% of plants down or leaning | 10% |
| 2 | From 16% to 25% of plants down or leaning | 20% |
| 3 | From 26% to 35% of plants down or leaning | 30% |
| 4 | From 36% to 45% of plants down or leaning | 40% |
| 5 | From 46% to 55% of plants down or leaning | 50% |
| 6 | From 56% to 65% of plants down or leaning | 60% |
| 7 | From 66% to 75% of plants down or leaning | 70% |
| 8 | From 76% to 85% of plants down or leaning | 80% |
| 9 | From 86% to 99% of plants down or leaning | 90% |
| 10 | Almost all plants down or leaning | 100% |

(1)Adapted from Embrapa (2009)