| Pearson’s r | No_Lat1st | No_Lat2nd | MedLat1st | MedLat2nd | MaxLat1st | MaxLat2nd | BrLat1st | BrLat2nd | BrLatTot | LBrZone | No_LatTot | ERcr | ICcr | DWcr | DWS | SPAD | LAcr | DWS | LAcr | ICcr | ERcr | N |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|---------|-----------|------|------|------|-----|------|------|-----|------|-----|------|-----|-----|
| No_Lat1st  | 1         | 0.76**    | 0.51     | 0.57**    | 0.51     | 0.34      | 0.36**   | 0.36**   | 0.58**   | 0.95**  | 0.47      | 0.38* | 0.30  | 0.05 | -0.30 | 0.42* | 0.46* | 0.39 | 0.53* | 0.39 | 0.05 |       |
| No_Lat2nd  | 1         | 0.58     | 0.69** | 0.76** | 0.64** | 0.23 | 0.37 | 0.30 | 0.45 | 0.90** | 0.49* | 0.05 | 0.21 | 0.39 | -0.24 | 0.52* | 0.55* | 0.48* | 0.46* | 0.16 |       |
| MedLat1st  | 1         | 0.58** | 0.66*** | 0.43* | 0.50* | 0.47* | 0.20 | 0.64** | 0.45* | 0.00 | 0.27 | 0.47* | -0.36 | 0.41* | 0.45* | 0.38 | 0.29 | 0.36 | 0.01 |       |
| MedLat2nd  | 1         | 0.62*** | 0.76*** | 0.77** | 0.09 | 0.21 | 0.15 | 0.22 | 0.59** | 0.08 | -0.16 | -0.12 | 0.42* | -0.36 | 0.21 | 0.26 | 0.12 | 0.56** | 0.09 | 0.03 |       |
| MaxLat1st  | 1         | 0.80*** | 0.40* | 0.52** | 0.46* | 0.30 | 0.71*** | 0.16 | -0.14 | 0.10 | 0.52** | -0.23 | 0.54** | 0.55** | 0.50* | 0.33 | 0.46* | -0.06 |       |       |
| MaxLat2nd  | 1         | 0.29     | 0.32     | 0.31     | 0.34     | 0.67** | 0.03     | 0.06     | 0.21     | 0.45* | -0.52** | 0.46* | 0.46* | 0.44* | 0.28 | 0.44* | 0.12 |       |       |
| BrLat1st   | 1         | 0.94*** | 0.99*** | -0.15 | 0.38 | 0.35 | 0.02 | 0.30 | 0.06 | -0.01 | 0.35 | 0.29 | 0.22 | 0.34 | 0.35 | -0.38 |       |       |
| BrLat2nd   | 1         | 0.98*** | 0.43* | 0.39 | -0.12 | 0.22 | 0.24 | 0.02 | 0.39 | 0.34 | 0.29 | 0.36 | 0.35 | -0.38 |       |       |       |       |
| BrLatTot   | 1         | -0.17 | 0.40* | 0.36 | -0.05 | 0.27 | 0.14 | 0.00 | 0.37 | 0.31 | 0.25 | 0.35 | 0.27 | -0.44** |       |       |       |
| LBrZone    | 1         | 0.55** | 0.43* | 0.22 | 0.28 | 0.19 | -0.28 | 0.48* | 0.51* | 0.47* | 0.44* | 0.47* | 0.12 |       |       |       |       |       |
| NoLatTot   | 1         | 0.43*   | 0.22 | 0.28 | 0.19 | -0.28 | 0.48* | 0.51* | 0.47* | 0.44* | 0.47* | 0.12 |       |       |       |       |       |       |
| ERcr       | 1         | 0.17     | 0.11     | 0.04 | -0.07 | 0.09 | 0.13 | 0.05 | 0.28 | 0.05 | -0.09 |       |       |       |       |       |       |       |
| ICcr       | 1         | 0.26 | -0.16 | -0.47* | 0.21 | 0.24 | 0.26 | -0.09 | 0.26 | 0.23 |       |       |       |       |       |       |       |       |
| DWcr       | 1         | 0.08     | 0.02 | 0.56** | 0.59** | -0.05 | 0.51* | 0.47* | 0.44* | 0.47* | 0.01 |       |       |       |       |       |       |       |
| SPAD       | 1         | -0.34 | 0.64*** | 0.65*** | 0.59** | 0.35 | 0.55** | -0.01 |       |       |       |       |       |       |       |       |       |       |
| LAcr       | 1         | 0.98*** | 0.95*** | 0.20 | 0.94*** | -0.13 |       |       |       |       |       |       |       |       |       |       |       |       |
| DWS        | 1         | 0.93*** | 0.26 | 0.92*** | -0.08 |       |       |       |       |       |       |       |       |       |       |       |       |       |
| LAcr       | 1         | 0.02 | 0.99*** | 0.03 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| ICcr       | 1         | -0.02 | -0.22 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| ERcr       | 1         | -0.01 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

Additional file 6: Correlation coefficients (Pearson’s r) of traits. Correlation was done based on best linear unbiased estimates (BLUPS). Abbreviations: Number of lateral roots in the first segment (No_Lat1st) or second segment (No_Lat2nd), length of representative lateral root in the first segment (MedLat1st) or second segment (MedLat2nd), maximal lateral root length in the first segment (MaxLat1st) or in the second segment (MaxLat2nd), branching density in the first segment (BrLat1st) or in the second segment (BrLat2nd), branching density across both segments (BrLatTot), length of the branching zone (LBrZone), total number of lateral roots (No_LatTot), elongation rate crown roots (ERcr), length of crown roots at solution change (intercept; ICcr), embryonic root dry weight (DWcr), crown root dry weight (DWcr), leaf greyness (SPAD), leaf area measured (LAcr), dry weight shoot (DWS), leaf area pixel based (LAcr), shoot pixel count at solution change intercept (ICcr), shoot pixel count development (ERcr), N content in the leaf in % of total dry weight (N). Significance level: ≤ 0.001 ***, ≤ 0.01 **, ≤ 0.05 *.