**Table S1:** The average and heterosis for different leaf traits among HY53

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Gene** | **LFW** | **LDW** | **LWC** | **LL** | **LW** | **LI** | **PL** | **LA** | **SLA** | **LTA** | **LBA** | **SD** | **SL** | **SW** |
| 34 | 0.670 | 0.173 | 73.90% | 8.90 | 5.23 | 1.71 | 1.20 | 48.00 | 275.044 | 72.67 | 283.67 | 3567 | 23.64 | 14.21 |
| 38 | 0.528 | 0.180 | 65.86% | 9.53 | 5.40 | 1.77 | 0.80 | 58.67 | 323.828 | 87.00 | 283.00 | 3600 | 23.72 | 13.96 |
| 41 | 0.576 | 0.174 | 69.47% | 9.43 | 4.40 | 2.15 | 0.77 | 40.83 | 232.769 | 62.33 | 299.33 | 4133 | 26.46 | 15.07 |
| 43 | 0.746 | 0.222 | 69.96% | 9.23 | 5.40 | 1.71 | 0.60 | 55.33 | 247.436 | 84.67 | 294.67 | 3300 | 26.26 | 14.52 |
| 45 | 0.627 | 0.244 | 61.17% | 8.20 | 5.13 | 1.60 | 0.80 | 37.33 | 155.364 | 77.33 | 280.67 | 4167 | 22.89 | 13.93 |
| 47 | 0.593 | 0.206 | 65.46% | 7.60 | 5.60 | 1.36 | 0.97 | 32.00 | 160.185 | 93.00 | 276.00 | 4933 | 21.78 | 13.54 |
| 52 | 0.549 | 0.165 | 69.90% | 7.47 | 4.73 | 1.58 | 1.30 | 50.00 | 302.461 | 84.00 | 286.00 | 2700 | 28.83 | 13.04 |
| 56 | 0.500 | 0.133 | 73.27% | 7.80 | 4.40 | 1.78 | 0.57 | 50.67 | 380.471 | 77.67 | 290.67 | 3000 | 24.81 | 12.40 |
| 63 | 0.631 | 0.190 | 70.02% | 8.13 | 5.43 | 1.50 | 1.07 | 64.33 | 341.292 | 105.00 | 284.00 | 3167 | 24.67 | 13.32 |
| 68 | 0.628 | 0.171 | 72.75% | 8.40 | 5.23 | 1.60 | 0.70 | 56.00 | 327.805 | 95.67 | 288.33 | 3367 | 26.10 | 13.35 |
| 100 | 0.787 | 0.254 | 67.71% | 9.27 | 5.97 | 1.55 | 1.13 | 62.33 | 245.579 | 88.00 | 288.00 | 2233 | 26.89 | 14.65 |
| 114 | 0.580 | 0.185 | 67.98% | 8.43 | 5.10 | 1.66 | 0.80 | 43.17 | 233.294 | 93.33 | 278.67 | 2267 | 26.13 | 14.13 |
| 125 | 0.707 | 0.213 | 69.72% | 8.70 | 5.77 | 1.51 | 1.13 | 71.33 | 335.100 | 98.67 | 259.33 | 3333 | 26.52 | 13.88 |
| 130 | 0.839 | 0.227 | 72.76% | 8.53 | 6.20 | 1.38 | 1.73 | 49.67 | 218.046 | 100.00 | 252.67 | 2133 | 27.25 | 13.03 |
| 147 | 0.567 | 0.188 | 67.10% | 8.17 | 4.73 | 1.72 | 0.77 | 23.00 | 124.228 | 88.00 | 272.67 | 4633 | 23.07 | 12.63 |
| 153 | 0.706 | 0.201 | 71.52% | 8.67 | 5.37 | 1.62 | 1.13 | 49.67 | 247.358 | 85.33 | 281.00 | 2767 | 27.36 | 13.82 |
| 177 | 0.697 | 0.211 | 69.68% | 8.23 | 5.30 | 1.56 | 0.67 | 53.67 | 249.572 | 81.67 | 279.00 | 3500 | 23.75 | 13.36 |
| 178 | 0.730 | 0.215 | 70.50% | 9.53 | 5.77 | 1.65 | 0.67 | 66.00 | 306.226 | 88.67 | 284.33 | 2800 | 24.21 | 13.17 |
| 853 | 0.685 | 0.202 | 70.33% | 9.27 | 4.90 | 1.89 | 0.53 | 46.67 | 230.239 | 82.33 | 292.67 | 4433 | 25.36 | 13.04 |
| pus5 (♀) | 0.764 | 0.194 | 74.61% | 9.90 | 5.10 | 1.95 | 0.47 | 39.00 | 201.341 | 84.67 | 298.00 | 3200 | 23.35 | 13.53 |
| psn3 (♂) | 0.645 | 0.203 | 68.50% | 6.97 | 6.03 | 1.16 | 2.63 | 42.00 | 206.771 | 100.00 | 260.00 | 2767 | 31.20 | 15.46 |
| Hm | -7.74% | -0.25% | -2.98% | 2.07% | -5.30% | 6.11% | -41.29% | 24.59% | 27.32% | -6.21% | 1.01% | 12.95% | -7.42% | -5.97% |
| Ho | -14.92% | -2.46% | -6.96% | -13.03% | -12.60% | -15.38% | -65.40% | 20.14% | 25.65% | -13.40% | -5.43% | 5.31% | -19.07% | -11.84% |