**Supplementary material for:**

Secondary sexual dimorphism in biomass production of *Ilex paraguariensis* progenies associated with their provenances and morphotypes

*Miroslava Rakocevic1,2\*, Aline de Holanda Nunes Maia2, Manoela Mendes Duarte1, Ivar Wendling1*

**Table S1**. Number and frequency (%) of progenies within six provenances that presented secondary sexual dimorphism (SSD) regarding yerba-mate biomass production per plant, in each harvest year.

|  |  |  |  |
| --- | --- | --- | --- |
| Provenance and progeny labeling | Total of progenies tested regarding SSD | Number of progenies that presented SSD | % of progeny segregation |
| 1999 | 2001 | 2003 | 2015 | 1999 | 2001 | 2003 | 2015 | 1999 | 2001 | 2003 | 2015 |
| Iv (1-25) | 25 | 25 | 25 | 25 | 4 | 3 | 1 | 2 | 16.0 | 12.0 |  4.0 |  8.0 |
| Co (26-50)\* | 18 | 15 |  6 | 18 | 1 | 0 | 1 | 1 |  5.6 | - | 14.3 |  5.6 |
| BC (51-75) | 21 | 21 | 21 | 21 | 2 | 1 | 4 | 3 |  9.5 |  4.8 | 19.1 | 14.3 |
| QI (76-100) | 24 | 24 | 24 | 24 | 0 | 0 | 1 | 1 | - | - |  4.2 |  4.2 |
| Pi (101-125) | 22 | 22 | 22 | 22 | 2 | 6 | 3 | 4 |  9.1 | 27.3 | 13.6 | 18.2 |
| Ca (150-175) | 25 | 25 | 25 | 25 | 1 | 3 | 2 | 1 |  4.0 | 12.0 |  8.0 |  4.0 |
| **Total** | 135 | 132 | 124 | 135 | 10 | 13 | 12 | 12 | 7.4 | 9.9 | 9.7 | 8.9 |
| \* In progenies from provenance Co, three (2001) and nine (2003) progenies were not tested regarding SSD because their number of plants in at least one gender class (F or M) was lower than three plants. This minimum n=3 of M or F plants is required to perform the Levene’s test of variances homogeneity and, consequently, to run the respective t-tests to compare F and M mean yerba-mate biomass per plant. |

**Table S2**. Mean, minimum and maximum of coefficient of variation (CV, %) of yerba-mate biomass production (kg plant-1) estimated in four harvest years (1999, 2001, 2003, 2015), for females (F) and males (M) originated on six provenances.

|  |  |  |
| --- | --- | --- |
|   |   |  Coefficient of variation (%)  |
| Year | Gender | Mean | Minimum | Maximum |
| 1999 | F | **77.65** | 60.18 | 121.66 |
| 1999 | M | **76.51** | 60.19 | 120.56 |
| 2001 | F | **93.40** | 69.73 | 167.03 |
| 2001 | M | **92.40** | 71.05 | 171.68 |
| 2003 | F | **75.92** | 55.65 | 126.88 |
| 2003 | M | **69.37** | 62.02 | 91.98 |
| 2015 | F | **75.66** | 60.68 | 97.33 |
| 2015 | M | **84.60** | 62.83 | 139.83 |

**Table S3**. Mean, minimum, maximum, and coefficient of variation (CV, %) of biomass production per plant (kg plant-1), of yerba-mate estimated in four harvest years (1999, 2001, 2003 and 2015) for females (F), and males (M) originated on six provenances (Iv-Ivaí, Co-Colombo, BC-Barão de Cotegipe, QI-Quedas do Iguaçú, Pi-Pinhão and Ca-Cascavel).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Gender | Provenance | N plants | Mean | Minimum | Maximum | **CV%** |
| 1999 | F | Iv | 608 | 0.85 | 0.03 | 2.60 | **65.79** |
|   |   | Co | 132 | 0.28 | 0.03 | 1.80 | **121.66** |
|   |   | BC | 462 | 0.94 | 0.03 | 3.75 | **60.18** |
|   |   | QI | 580 | 0.88 | 0.03 | 3.70 | **63.75** |
|   |   | Pi | 262 | 0.57 | 0.03 | 3.00 | **87.56** |
|   |   | Ca | 593 | 0.81 | 0.03 | 3.10 | **66.95** |
| 1999 | M | Iv | 506 | 0.88 | 0.03 | 3.00 | **63.57** |
|   |   | Co | 174 | 0.34 | 0.03 | 3.00 | **120.56** |
|   |   | BC | 485 | 0.91 | 0.03 | 3.20 | **66.52** |
|   |   | QI | 535 | 0.89 | 0.03 | 2.30 | **60.19** |
|   |   | Pi | 268 | 0.59 | 0.03 | 2.90 | **83.68** |
|   |   | Ca | 530 | 0.82 | 0.03 | 3.00 | **64.50** |
| 2001 | F | Iv | 602 | 1.85 | 0.03 | 7.80 | **75.59** |
|   |   | Co | 65 | 0.43 | 0.03 | 2.85 | **167.03** |
|   |   | BC | 457 | 2.03 | 0.05 | 9.20 | **69.73** |
|   |   | QI | 579 | 2.08 | 0.05 | 11.30 | **71.97** |
|   |   | Pi | 233 | 1.03 | 0.03 | 7.50 | **103.47** |
|   |   | Ca | 593 | 1.77 | 0.03 | 8.80 | **72.62** |
| 2001 | M | Iv | 500 | 1.96 | 0.03 | 6.80 | **71.05** |
|   |   | Co | 96 | 0.51 | 0.03 | 4.00 | **171.68** |
|   |   | BC | 479 | 2.07 | 0.03 | 8.00 | **72.17** |
|   |   | QI | 535 | 2.09 | 0.05 | 8.55 | **71.14** |
|   |   | Pi | 229 | 1.26 | 0.05 | 5.70 | **94.92** |
|   |   | Ca | 526 | 1.90 | 0.03 | 8.60 | **73.44** |
| 2003 | F | Iv | 578 | 5.14 | 0.10 | 17.90 | **65.25** |
|   |   | Co | 26 | 2.46 | 0.25 | 13.30 | **126.88** |
|   |   | BC | 445 | 5.80 | 0.15 | 18.30 | **55.65** |
|   |   | QI | 569 | 5.64 | 0.10 | 19.20 | **60.72** |
|   |   | Pi | 198 | 3.06 | 0.05 | 16.75 | **80.43** |
|   |   | Ca | 587 | 4.91 | 0.15 | 18.70 | **66.58** |
| 2003 | M | Iv | 484 | 5.37 | 0.15 | 22.60 | **62.02** |
|   |   | Co | 41 | 3.15 | 0.15 | 11.10 | **91.98** |
|   |   | BC | 464 | 5.68 | 0.05 | 22.80 | **63.31** |
|   |   | QI | 528 | 5.62 | 0.25 | 21.20 | **63.69** |
|   |   | Pi | 200 | 3.60 | 0.10 | 11.90 | **68.33** |
|   |   | Ca | 516 | 5.05 | 0.10 | 19.10 | **66.88** |
| 2015 | F | Iv | 583 | 8.74 | 0.15 | 38.30 | **75.76** |
|   |   | Co | 131 | 3.72 | 0.05 | 22.00 | **97.33** |
|   |   | BC | 455 | 9.14 | 0.25 | 41.80 | **64.91** |
|   |   | QI | 554 | 9.20 | 0.15 | 30.00 | **60.68** |
|   |   | Pi | 253 | 4.61 | 0.05 | 27.00 | **90.81** |
|   |   | Ca | 577 | 8.17 | 0.15 | 29.25 | **64.45** |
| 2015 | M | Iv | 489 | 8.89 | 0.25 | 37.00 | **72.86** |
|   |   | Co | 163 | 3.94 | 0.05 | 33.40 | **139.83** |
|   |   | BC | 468 | 8.93 | 0.20 | 36.60 | **65.85** |
|   |   | QI | 526 | 8.81 | 0.25 | 30.20 | **62.83** |
|   |   | Pi | 253 | 6.32 | 0.05 | 44.70 | **100.27** |
|   |   | Ca | 518 | 7.79 | 0.05 | 28.70 | **65.98** |



**Figure S1**. Metrics for inter-plant variability (CV, %) considering six provenances (Iv-Ivaí, Co-Colombo, BC-Barão de Cotegipe, QI-Quedas do Iguaçú, Pi-Pinhão and Ca-Cascavel), 124-135 progenies, and four years: **A**) 1999, **B**) 2001, **C**) 2003, and **D**) 2015.