

## ***Supplementary Material***

### **Genetic diversity, relationships among traits and selection of tropical maize inbred lines for low-P tolerance based on root and shoot traits at seedling stage**

**Supplementary table 2.** Low-phosphorus tolerance index (LPTI), low-phosphorus performance index (LPPI) and predicted genotypic means for root and shoot-related traits measured in 151 tropical maize inbred lines evaluated under non-applied and applied P.

| Inbred Lines |       |       | Applied phosphorus |       |         |        |      |         |      |         |
|--------------|-------|-------|--------------------|-------|---------|--------|------|---------|------|---------|
|              | LPTI  | LPPI  | SD                 | PH    | SDW     | RDW    | RSR  | TDW     | DG   | LRL     |
| VML001       | 1.318 | 0.999 | 7.81               | 14.05 | 1225.59 | 408.42 | 0.33 | 1625.20 | 0.60 | 1773.07 |
| VML002       | 3.139 | 0.491 | 6.32               | 13.56 | 748.06  | 206.87 | 0.24 | 933.10  | 0.56 | 1055.94 |
| VML003       | 0.454 | 0.98  | 8.40               | 21.23 | 1868.30 | 474.64 | 0.27 | 2341.48 | 0.83 | 1530.09 |
| VML004       | 0.78  | 1.105 | 9.35               | 20.56 | 2099.55 | 555.25 | 0.28 | 2658.82 | 0.78 | 1590.81 |
| VML005       | 0.367 | 0.071 | 8.23               | 18.65 | 1688.10 | 483.27 | 0.29 | 2169.21 | 0.72 | 1489.07 |
| VML006       | -0.52 | -1.09 | 9.51               | 20.47 | 2646.16 | 601.32 | 0.26 | 3257.23 | 0.72 | 1587.43 |
| VML007       | -0.26 | 0.835 | 9.69               | 16.15 | 1904.34 | 523.58 | 0.28 | 2429.12 | 0.62 | 1712.68 |
| VML008       | -0.45 | 0.311 | 9.22               | 18.16 | 2018.46 | 641.63 | 0.32 | 2667.88 | 0.66 | 1430.99 |
| VML009       | 0.995 | 0.628 | 9.14               | 13.38 | 1303.67 | 483.27 | 0.38 | 1782.36 | 0.52 | 1231.95 |
| VML010       | -1.22 | -0.78 | 10.58              | 18.74 | 2036.48 | 632.99 | 0.32 | 2676.95 | 0.69 | 1582.58 |
| VML011       | -0.32 | 0.246 | 10.28              | 18.31 | 1739.15 | 575.41 | 0.33 | 2317.30 | 0.70 | 1609.26 |
| VML012       | -1.54 | -0.55 | 9.14               | 21.54 | 2000.44 | 609.96 | 0.31 | 2616.51 | 0.80 | 1639.32 |
| VML015       | -1.16 | -0.84 | 10.85              | 24.10 | 2462.95 | 638.75 | 0.28 | 3112.16 | 0.82 | 1468.38 |
| VML016       | -1.32 | 0.534 | 10.42              | 21.57 | 2772.29 | 753.92 | 0.29 | 3544.34 | 0.73 | 2136.32 |
| VML017       | -0.9  | -0.78 | 8.97               | 18.43 | 2315.79 | 768.31 | 0.34 | 3100.07 | 0.67 | 1480.94 |
| VML018       | 0.305 | -0.14 | 7.87               | 14.99 | 1144.50 | 396.90 | 0.34 | 1531.51 | 0.66 | 1552.48 |
| VML020       | 0.705 | -0.38 | 7.35               | 17.49 | 1315.69 | 417.05 | 0.32 | 1724.93 | 0.71 | 1038.39 |
| VML021       | -1.02 | -0.77 | 8.70               | 15.88 | 1558.96 | 555.25 | 0.35 | 2114.81 | 0.62 | 1737.83 |
| VML022       | -1.28 | 0.266 | 9.56               | 20.35 | 2919.46 | 679.06 | 0.27 | 3613.86 | 0.72 | 1708.57 |
| VML023       | -0.33 | 0.331 | 10.49              | 18.22 | 1582.98 | 535.10 | 0.34 | 2117.83 | 0.69 | 1562.84 |
| VML024       | -0.81 | 0.381 | 8.70               | 19.41 | 2105.56 | 722.25 | 0.34 | 2840.15 | 0.70 | 1535.86 |
| VML025       | -0.54 | -1.4  | 7.52               | 19.35 | 1372.75 | 428.57 | 0.32 | 1794.45 | 0.78 | 1263.61 |
| VML026       | 0.016 | 0.245 | 8.29               | 18.34 | 1408.79 | 457.36 | 0.33 | 1860.94 | 0.73 | 1650.38 |
| VML027       | -0.18 | 0.545 | 10.62              | 20.32 | 1997.44 | 598.44 | 0.31 | 2601.39 | 0.78 | 1905.91 |
| VML028       | 0.908 | -0.5  | 7.25               | 16.91 | 1294.66 | 356.59 | 0.28 | 1640.31 | 0.65 | 1381.36 |
| VML030       | 1.539 | 1.299 | 8.23               | 15.36 | 1483.87 | 535.10 | 0.36 | 2018.09 | 0.67 | 1533.63 |
| VML031       | 0.122 | 0.29  | 7.96               | 19.19 | 1429.81 | 379.62 | 0.27 | 1800.49 | 0.80 | 1667.77 |
| VML032       | -0.23 | 0.821 | 8.98               | 21.81 | 1964.40 | 604.20 | 0.31 | 2574.19 | 0.85 | 1876.01 |
| VML033       | 0.093 | 0.888 | 9.72               | 22.45 | 2441.93 | 661.78 | 0.29 | 3115.18 | 0.89 | 1655.02 |
| VML034       | -0.41 | 0.218 | 9.23               | 18.95 | 1748.16 | 687.70 | 0.38 | 2444.24 | 0.72 | 1613.37 |
| VML036       | 1.682 | 1.457 | 7.63               | 13.96 | 1225.59 | 434.33 | 0.35 | 1652.40 | 0.62 | 1657.50 |
| VML039       | -0.89 | -0.22 | 11.19              | 18.04 | 2117.57 | 687.70 | 0.33 | 2815.98 | 0.60 | 1307.28 |

|        |       |       |       |       |         |        |      |         |      |         |
|--------|-------|-------|-------|-------|---------|--------|------|---------|------|---------|
| VML040 | -0.28 | 0.552 | 8.02  | 19.53 | 1564.96 | 572.53 | 0.36 | 2138.99 | 0.80 | 1861.99 |
| VML041 | 1.209 | 0.901 | 8.26  | 15.36 | 1324.70 | 431.45 | 0.32 | 1749.11 | 0.63 | 1301.75 |
| VML042 | 0.699 | 0.695 | 8.58  | 19.38 | 1631.04 | 512.07 | 0.32 | 2142.01 | 0.79 | 1530.05 |
| VML043 | -0.85 | -1    | 8.31  | 17.34 | 1387.77 | 437.21 | 0.31 | 1818.62 | 0.74 | 1673.05 |
| VML044 | 0.747 | 0.388 | 8.34  | 14.90 | 1291.66 | 466.00 | 0.36 | 1752.13 | 0.60 | 1607.29 |
| VML046 | 0.646 | 1.024 | 9.32  | 15.82 | 1895.33 | 716.49 | 0.37 | 2622.55 | 0.62 | 1794.82 |
| VML047 | 0.466 | -0.28 | 7.35  | 16.06 | 1192.55 | 396.90 | 0.33 | 1579.86 | 0.63 | 1437.38 |
| VML048 | -0.76 | -0.93 | 8.03  | 15.02 | 1069.42 | 399.78 | 0.37 | 1458.97 | 0.60 | 1525.29 |
| VML049 | -0.05 | -0.21 | 8.11  | 15.18 | 1144.50 | 419.93 | 0.36 | 1555.69 | 0.62 | 1417.49 |
| VML050 | -0.29 | -1    | 8.33  | 18.83 | 1444.83 | 489.03 | 0.33 | 1930.45 | 0.76 | 1685.29 |
| VML051 | -1.4  | -1.41 | 8.08  | 20.41 | 1640.05 | 566.77 | 0.34 | 2208.50 | 0.81 | 1586.83 |
| VML052 | -0.67 | 0.03  | 9.14  | 21.81 | 2856.39 | 722.25 | 0.28 | 3595.72 | 0.76 | 1453.60 |
| VML053 | 0.453 | 0.206 | 8.71  | 17.09 | 1637.04 | 561.01 | 0.34 | 2199.43 | 0.65 | 1375.34 |
| VML054 | -1.34 | -0.32 | 10.25 | 19.59 | 2640.15 | 647.39 | 0.26 | 3299.54 | 0.73 | 1926.62 |
| VML055 | -0.33 | 0.144 | 8.73  | 20.99 | 2087.54 | 454.48 | 0.24 | 2540.95 | 0.80 | 1750.12 |
| VML056 | 0.086 | -0.27 | 7.71  | 18.71 | 1480.87 | 572.53 | 0.38 | 2054.36 | 0.73 | 1423.66 |
| VML057 | 0.453 | -0.02 | 8.55  | 17.67 | 1225.59 | 437.21 | 0.35 | 1655.42 | 0.72 | 1267.29 |
| VML058 | -0.51 | -0.74 | 9.40  | 20.23 | 2156.62 | 569.65 | 0.28 | 2731.35 | 0.73 | 1544.26 |
| VML059 | 0.079 | 0.336 | 9.03  | 16.67 | 1820.24 | 517.82 | 0.29 | 2338.46 | 0.62 | 1598.95 |
| VML061 | -0.02 | -1.6  | 7.26  | 19.19 | 1141.49 | 376.74 | 0.33 | 1507.33 | 0.77 | 1448.02 |
| VML063 | 0.066 | 0.272 | 8.85  | 17.16 | 1856.28 | 532.22 | 0.30 | 2389.83 | 0.67 | 1475.62 |
| VML064 | 0.598 | 0.253 | 8.18  | 14.66 | 1282.65 | 405.54 | 0.31 | 1679.60 | 0.62 | 1447.00 |
| VML065 | 0.575 | -0.42 | 7.71  | 15.42 | 1282.65 | 417.05 | 0.33 | 1691.69 | 0.65 | 1440.22 |
| VML066 | -0.65 | 0.026 | 8.97  | 19.07 | 1820.24 | 612.84 | 0.33 | 2438.19 | 0.75 | 1740.60 |
| VML067 | -1.26 | -1.13 | 9.01  | 18.19 | 1910.34 | 563.89 | 0.30 | 2477.48 | 0.70 | 1458.08 |
| VML068 | -0.17 | 0.543 | 9.11  | 19.07 | 2102.56 | 684.82 | 0.33 | 2797.84 | 0.73 | 1761.12 |
| VML069 | 1.064 | -0.11 | 6.67  | 16.76 | 979.32  | 322.04 | 0.32 | 1286.70 | 0.72 | 1281.73 |
| VML070 | 0.279 | 0.244 | 8.88  | 18.13 | 1607.01 | 509.19 | 0.32 | 2114.81 | 0.69 | 1472.68 |
| VML073 | -1.27 | -0.25 | 10.14 | 16.94 | 1907.34 | 578.29 | 0.31 | 2489.57 | 0.64 | 1635.81 |
| VML074 | 1.423 | -0.03 | 7.18  | 17.67 | 1057.40 | 322.04 | 0.30 | 1365.28 | 0.73 | 1191.48 |
| VML075 | 0.671 | -0.22 | 7.32  | 16.42 | 1144.50 | 471.76 | 0.39 | 1610.09 | 0.69 | 1523.18 |
| VML076 | 0.036 | 1.351 | 9.01  | 22.33 | 1877.31 | 532.22 | 0.30 | 2410.99 | 0.88 | 1765.41 |
| VML080 | 0.546 | 0.259 | 8.40  | 15.94 | 1628.03 | 503.43 | 0.31 | 2129.92 | 0.64 | 1745.36 |
| VML081 | 0.108 | -0.69 | 7.84  | 16.76 | 1144.50 | 466.00 | 0.40 | 1604.04 | 0.69 | 1238.39 |
| VML083 | 0.305 | -0.83 | 6.61  | 16.39 | 895.22  | 362.35 | 0.39 | 1244.39 | 0.69 | 1122.68 |
| VML084 | 0.16  | -0.58 | 7.47  | 14.75 | 1288.66 | 454.48 | 0.35 | 1737.02 | 0.59 | 1259.82 |
| VML085 | -0.65 | -0.05 | 9.94  | 21.29 | 1988.43 | 480.40 | 0.26 | 2468.41 | 0.78 | 1618.91 |
| VML086 | -1.29 | -1.22 | 8.14  | 20.11 | 1282.65 | 324.92 | 0.26 | 1594.98 | 0.77 | 1283.43 |
| VML087 | 0.843 | 0.446 | 8.27  | 17.76 | 1676.08 | 584.05 | 0.35 | 2262.90 | 0.72 | 1668.47 |
| VML088 | 1.55  | -0.1  | 7.68  | 15.27 | 1417.80 | 402.66 | 0.29 | 1812.58 | 0.60 | 1098.36 |
| VML089 | 0.627 | -0.34 | 8.18  | 19.89 | 1931.37 | 440.09 | 0.25 | 2368.68 | 0.77 | 1545.16 |
| VML090 | -1    | -0.75 | 11.01 | 18.86 | 2426.91 | 641.63 | 0.28 | 3078.91 | 0.66 | 1494.75 |
| VML091 | 0.302 | -0    | 7.13  | 16.52 | 1276.64 | 474.64 | 0.36 | 1746.09 | 0.68 | 1634.96 |
| VML092 | -0.06 | 0.272 | 9.01  | 18.46 | 1811.23 | 471.76 | 0.28 | 2281.03 | 0.73 | 1862.53 |

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|--------|-------|-------|-------|-------|---------|--------|------|---------|------|---------|
| VML093 | -0.48 | -0.25 | 9.38  | 18.01 | 1823.25 | 503.43 | 0.29 | 2326.37 | 0.72 | 1673.06 |
| VML094 | -1.03 | -1.08 | 8.45  | 17.43 | 1561.96 | 517.82 | 0.33 | 2078.54 | 0.67 | 1479.06 |
| VML095 | -0.51 | -0.7  | 8.76  | 19.68 | 1540.94 | 480.40 | 0.31 | 2018.09 | 0.74 | 1412.93 |
| VML096 | -0.53 | -0.41 | 8.33  | 15.21 | 1534.93 | 546.62 | 0.35 | 2081.56 | 0.60 | 1719.22 |
| VML097 | -0.11 | -0.04 | 8.63  | 18.13 | 1820.24 | 609.96 | 0.33 | 2435.17 | 0.71 | 1717.69 |
| VML099 | 1.124 | 0.208 | 8.06  | 15.33 | 1342.72 | 434.33 | 0.32 | 1770.27 | 0.63 | 1499.93 |
| VML100 | -0.54 | 0.134 | 9.96  | 20.26 | 2898.43 | 736.64 | 0.27 | 3653.15 | 0.74 | 1475.94 |
| VML102 | -0.86 | -0.01 | 9.77  | 22.09 | 2441.93 | 632.99 | 0.27 | 3084.96 | 0.78 | 1473.75 |
| VML104 | -1.15 | -0.78 | 9.20  | 22.21 | 2018.46 | 529.34 | 0.27 | 2550.02 | 0.81 | 1573.76 |
| VML106 | -0.79 | 0.665 | 10.49 | 20.38 | 2318.79 | 756.80 | 0.33 | 3091.00 | 0.71 | 1754.29 |
| VML107 | -0.9  | 0.014 | 9.97  | 18.13 | 2054.50 | 644.51 | 0.32 | 2707.17 | 0.66 | 1740.69 |
| VML110 | -1.29 | -0.52 | 9.71  | 20.32 | 2027.47 | 699.21 | 0.34 | 2737.40 | 0.70 | 1779.48 |
| VML111 | -0.81 | -0.81 | 8.05  | 14.20 | 1327.70 | 509.19 | 0.38 | 1833.74 | 0.57 | 1443.44 |
| VML112 | 0.443 | 0.459 | 9.08  | 15.57 | 1682.09 | 578.29 | 0.35 | 2262.90 | 0.61 | 1648.22 |
| VML113 | 0.659 | 0.781 | 8.95  | 22.91 | 1643.05 | 419.93 | 0.27 | 2057.38 | 0.84 | 1425.79 |
| VML114 | 0.53  | 0.901 | 9.42  | 19.07 | 1700.11 | 552.37 | 0.32 | 2253.83 | 0.75 | 1628.74 |
| VML116 | -0.67 | -1.08 | 9.00  | 15.72 | 1540.94 | 463.12 | 0.31 | 1999.96 | 0.60 | 1441.12 |
| VML117 | -1.23 | -0.3  | 10.59 | 20.96 | 1913.35 | 601.32 | 0.32 | 2519.79 | 0.77 | 1855.78 |
| VML118 | -0.03 | 1.294 | 10.51 | 16.27 | 2198.66 | #####  | 0.45 | 3236.07 | 0.61 | 1635.79 |
| VML119 | 1.596 | 0.995 | 7.31  | 15.72 | 937.27  | 454.48 | 0.48 | 1383.42 | 0.65 | 1544.46 |
| VML120 | 0.595 | -0.55 | 8.00  | 16.61 | 1297.67 | 370.99 | 0.29 | 1658.44 | 0.64 | 1216.11 |
| VML121 | 1.634 | 1.355 | 7.83  | 17.95 | 1324.70 | 417.05 | 0.31 | 1734.00 | 0.75 | 1386.64 |
| VML122 | -0.24 | -0.56 | 8.24  | 18.65 | 1558.96 | 460.24 | 0.30 | 2015.07 | 0.72 | 1664.95 |
| VML123 | -0.13 | 0.668 | 10.11 | 19.59 | 2309.78 | 684.82 | 0.31 | 3006.38 | 0.69 | 1687.42 |
| VML124 | -0.07 | -0.78 | 6.76  | 14.11 | 1000.34 | 376.74 | 0.36 | 1365.28 | 0.56 | 1339.30 |
| VML125 | -0.97 | -1.23 | 8.40  | 10.55 | 1141.49 | 535.10 | 0.46 | 1673.56 | 0.42 | 1288.02 |
| VML126 | -0.07 | 0.357 | 8.48  | 20.44 | 2171.63 | 561.01 | 0.28 | 2737.40 | 0.73 | 1633.49 |
| VML127 | -0.99 | -0.97 | 8.12  | 19.19 | 1715.13 | 578.29 | 0.34 | 2296.14 | 0.74 | 1437.72 |
| VML128 | 0.235 | 0.289 | 8.15  | 16.24 | 1375.75 | 454.48 | 0.33 | 1824.67 | 0.66 | 1270.62 |
| VML129 | -1.02 | -1.17 | 8.54  | 15.36 | 1579.98 | 517.82 | 0.33 | 2096.67 | 0.60 | 1554.41 |
| VML130 | 1.402 | 0.427 | 6.95  | 15.97 | 1129.48 | 373.87 | 0.33 | 1492.22 | 0.71 | 1296.40 |
| VML131 | 0.273 | 0.326 | 9.05  | 16.03 | 1979.42 | 644.51 | 0.35 | 2631.62 | 0.60 | 2019.74 |
| VML132 | -1.29 | -1.06 | 8.66  | 20.63 | 1763.18 | 537.98 | 0.31 | 2302.19 | 0.74 | 1417.51 |
| VML133 | 1.505 | 0.57  | 7.55  | 12.07 | 1048.39 | 460.24 | 0.43 | 1501.29 | 0.52 | 1367.10 |
| VML134 | -1.4  | 0.382 | 10.83 | 26.26 | 2916.45 | 788.47 | 0.28 | 3725.68 | 0.88 | 2076.85 |
| VML136 | 0.439 | 0.263 | 8.66  | 16.91 | 1736.15 | 561.01 | 0.32 | 2299.17 | 0.64 | 1083.43 |
| VML137 | 1.737 | 0.936 | 7.86  | 13.56 | 985.32  | 362.35 | 0.36 | 1335.06 | 0.57 | 1319.05 |
| VML138 | -1.14 | -0.54 | 9.16  | 18.62 | 1955.39 | 549.50 | 0.30 | 2507.70 | 0.71 | 2080.77 |
| VML139 | -0.13 | 0.237 | 9.96  | 17.40 | 1631.04 | 486.15 | 0.30 | 2114.81 | 0.69 | 1281.81 |
| VML140 | -0.63 | 0.396 | 10.33 | 20.72 | 3117.68 | 941.06 | 0.32 | 4088.35 | 0.73 | 1919.00 |
| VML141 | -0.86 | -0.18 | 9.16  | 21.96 | 2177.64 | 483.27 | 0.24 | 2661.84 | 0.84 | 1900.67 |
| VML143 | -0.05 | 0.435 | 9.35  | 16.76 | 1522.92 | 529.34 | 0.35 | 2051.34 | 0.67 | 1484.68 |
| VML144 | -1.31 | 1.153 | 10.82 | 26.35 | 3078.63 | 926.67 | 0.31 | 4033.95 | 0.96 | 2061.59 |
| VML145 | 0.831 | -0.02 | 8.34  | 15.30 | 1309.68 | 391.14 | 0.30 | 1691.69 | 0.60 | 1272.99 |

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|--------|-------|-------|-------|-------|---------|--------|------|---------|------|---------|
| VML146 | 0.578 | 0.296 | 8.89  | 18.56 | 1456.84 | 471.76 | 0.32 | 1924.40 | 0.72 | 1522.26 |
| VML147 | -0.39 | -0.09 | 8.30  | 23.55 | 1937.37 | 483.27 | 0.26 | 2420.06 | 0.91 | 1672.95 |
| VML148 | 0.696 | 0.343 | 8.02  | 17.55 | 1525.92 | 399.78 | 0.27 | 1918.36 | 0.67 | 1225.55 |
| VML150 | 0.07  | 0.265 | 8.52  | 17.98 | 1679.09 | 517.82 | 0.32 | 2196.41 | 0.65 | 1532.79 |
| VML151 | -0.13 | 0.669 | 9.40  | 17.46 | 1973.41 | 552.37 | 0.29 | 2528.86 | 0.65 | 1635.83 |
| VML152 | 2.076 | -0.3  | 5.96  | 16.46 | 805.12  | 221.27 | 0.26 | 1005.63 | 0.67 | 1150.58 |
| VML153 | 2.37  | 0.595 | 6.78  | 15.18 | 946.28  | 284.61 | 0.30 | 1214.17 | 0.68 | 1262.95 |
| VML154 | -1.32 | 0.225 | 10.92 | 23.79 | 2736.25 | 725.13 | 0.28 | 3477.85 | 0.83 | 1656.68 |
| VML155 | -0.3  | 0.866 | 8.49  | 22.33 | 1802.22 | 563.89 | 0.32 | 2368.68 | 0.88 | 1536.51 |
| VML156 | 0.483 | -0.65 | 8.26  | 14.75 | 1006.35 | 408.42 | 0.39 | 1404.57 | 0.65 | 1567.31 |
| VML157 | 0.646 | 0.425 | 7.75  | 15.39 | 1342.72 | 489.03 | 0.36 | 1827.69 | 0.67 | 1589.20 |
| VML158 | 2.696 | -0.44 | 5.59  | 14.84 | 691.00  | 218.39 | 0.30 | 887.76  | 0.67 | 961.85  |
| VML159 | 0.18  | 0.348 | 10.27 | 15.27 | 1724.14 | 523.58 | 0.31 | 2247.79 | 0.57 | 1464.12 |
| VML160 | 0.082 | 0.186 | 8.46  | 18.07 | 1790.21 | 543.74 | 0.31 | 2335.43 | 0.72 | 1556.65 |
| VML161 | 0.135 | -0.2  | 8.33  | 22.15 | 1928.36 | 566.77 | 0.30 | 2498.64 | 0.75 | 1399.39 |
| VML162 | -0.83 | -1.28 | 9.42  | 17.79 | 1745.16 | 431.45 | 0.26 | 2172.23 | 0.66 | 1616.51 |
| VML164 | 0.011 | -0.15 | 8.26  | 20.41 | 1829.25 | 497.67 | 0.28 | 2326.37 | 0.75 | 1417.81 |
| VML165 | 1.223 | 0.95  | 8.76  | 14.23 | 1570.97 | 532.22 | 0.33 | 2102.72 | 0.57 | 1587.79 |
| VML168 | 0.02  | -0.17 | 8.97  | 19.99 | 1697.11 | 483.27 | 0.30 | 2178.28 | 0.76 | 1367.23 |
| VML170 | -0.41 | -0.72 | 8.30  | 18.16 | 1141.49 | 448.72 | 0.38 | 1582.89 | 0.72 | 1275.99 |
| VML171 | 0.629 | -0.27 | 8.95  | 12.95 | 1105.46 | 445.85 | 0.39 | 1543.60 | 0.56 | 1479.87 |
| VML173 | -1.17 | -0.24 | 10.46 | 20.75 | 2339.82 | 814.38 | 0.35 | 3172.60 | 0.72 | 1776.94 |
| VML174 | 1.345 | 0.882 | 7.94  | 17.03 | 1258.62 | 396.90 | 0.31 | 1646.35 | 0.72 | 1323.89 |
| VML175 | -1.45 | -1.05 | 8.88  | 21.36 | 2009.45 | 491.91 | 0.26 | 2501.66 | 0.82 | 1560.62 |
| VML176 | 0.047 | 0.289 | 9.74  | 16.15 | 2108.56 | 664.66 | 0.32 | 2782.73 | 0.60 | 1536.62 |
| VML178 | -1.39 | -0.03 | 10.45 | 20.96 | 2381.86 | 710.73 | 0.31 | 3106.11 | 0.78 | 1387.08 |
| VML179 | 1.051 | 0.801 | 7.74  | 16.52 | 1249.61 | 431.45 | 0.34 | 1673.56 | 0.71 | 1516.41 |
| VML180 | 0.117 | -0.59 | 7.86  | 16.06 | 1513.91 | 454.48 | 0.31 | 1963.69 | 0.65 | 1375.47 |
| VML183 | 0.817 | 0.349 | 7.23  | 17.73 | 1273.64 | 414.17 | 0.32 | 1679.60 | 0.75 | 1559.90 |
| VML184 | 1.045 | -0.33 | 7.23  | 17.98 | 1330.70 | 385.38 | 0.30 | 1706.80 | 0.74 | 1516.20 |
| VML188 | -0.94 | -0.16 | 8.85  | 21.14 | 2646.16 | 733.76 | 0.29 | 3396.25 | 0.78 | 1561.00 |

| Inbred Lines |       |       | Applied phosphorus |        |      |      |       | Non-applied phosphorus |       |        |
|--------------|-------|-------|--------------------|--------|------|------|-------|------------------------|-------|--------|
|              | LPTI  | LPPI  | TRL                | RSA    | RV   | RAD  | RTD   | SD                     | PH    | SDW    |
| VML001       | 1.318 | 0.999 | 2494.10            | 410.24 | 5.32 | 0.54 | 78.88 | 4.47                   | 11.66 | 717.42 |
| VML002       | 3.139 | 0.491 | 1398.90            | 189.74 | 2.26 | 0.49 | 82.33 | 4.56                   | 11.96 | 540.31 |
| VML003       | 0.454 | 0.98  | 2249.40            | 413.83 | 6.13 | 0.59 | 79.70 | 4.62                   | 13.29 | 741.57 |
| VML004       | 0.78  | 1.105 | 2421.45            | 454.09 | 6.76 | 0.59 | 82.44 | 5.18                   | 13.74 | 870.38 |
| VML005       | 0.367 | 0.071 | 2188.81            | 392.80 | 5.66 | 0.58 | 85.08 | 4.56                   | 12.97 | 763.04 |
| VML006       | -0.52 | -1.09 | 2414.23            | 449.87 | 6.64 | 0.59 | 88.01 | 3.96                   | 10.57 | 585.93 |
| VML007       | -0.26 | 0.835 | 2591.47            | 495.10 | 7.45 | 0.60 | 74.61 | 5.14                   | 9.43  | 779.14 |
| VML008       | -0.45 | 0.311 | 2296.43            | 513.26 | 9.27 | 0.69 | 75.08 | 4.73                   | 11.05 | 746.94 |
| VML009       | 0.995 | 0.628 | 1790.52            | 325.29 | 4.91 | 0.60 | 93.36 | 5.15                   | 8.58  | 712.05 |
| VML010       | -1.22 | -0.78 | 2389.48            | 459.94 | 7.06 | 0.61 | 87.12 | 4.29                   | 10.17 | 575.20 |
| VML011       | -0.32 | 0.246 | 2447.60            | 466.78 | 7.08 | 0.60 | 82.62 | 4.71                   | 11.32 | 631.55 |

|        |       |       |         |        |       |      |       |      |       |         |
|--------|-------|-------|---------|--------|-------|------|-------|------|-------|---------|
| VML012 | -1.54 | -0.55 | 2534.86 | 483.67 | 7.30  | 0.60 | 83.29 | 4.03 | 10.39 | 551.05  |
| VML015 | -1.16 | -0.84 | 2312.28 | 474.35 | 7.81  | 0.64 | 82.56 | 3.94 | 11.42 | 583.25  |
| VML016 | -1.32 | 0.534 | 3209.14 | 585.62 | 8.20  | 0.57 | 88.71 | 4.60 | 11.05 | 695.95  |
| VML017 | -0.9  | -0.78 | 2425.24 | 525.58 | 9.10  | 0.66 | 84.37 | 4.14 | 9.08  | 615.45  |
| VML018 | 0.305 | -0.14 | 2214.57 | 373.20 | 5.07  | 0.56 | 79.48 | 4.17 | 10.25 | 569.83  |
| VML020 | 0.705 | -0.38 | 1596.73 | 305.22 | 5.01  | 0.65 | 82.90 | 4.33 | 11.21 | 618.13  |
| VML021 | -1.02 | -0.77 | 2490.88 | 431.93 | 5.94  | 0.56 | 89.85 | 4.17 | 8.76  | 529.58  |
| VML022 | -1.28 | 0.266 | 2761.60 | 597.59 | 10.26 | 0.66 | 77.43 | 4.49 | 10.68 | 714.74  |
| VML023 | -0.33 | 0.331 | 2310.12 | 419.24 | 6.09  | 0.59 | 86.04 | 4.62 | 11.08 | 679.85  |
| VML024 | -0.81 | 0.381 | 2405.84 | 496.46 | 8.22  | 0.65 | 86.23 | 4.72 | 10.44 | 875.74  |
| VML025 | -0.54 | -1.4  | 1899.91 | 351.23 | 5.34  | 0.61 | 80.91 | 3.73 | 9.64  | 492.01  |
| VML026 | 0.016 | 0.245 | 2410.34 | 410.57 | 5.54  | 0.55 | 82.61 | 4.45 | 10.87 | 671.80  |
| VML027 | -0.18 | 0.545 | 2840.68 | 526.17 | 7.62  | 0.58 | 80.50 | 4.97 | 12.54 | 679.85  |
| VML028 | 0.908 | -0.5  | 2102.34 | 370.63 | 5.37  | 0.59 | 72.32 | 4.24 | 12.76 | 669.12  |
| VML030 | 1.539 | 1.299 | 2258.22 | 409.13 | 5.96  | 0.59 | 87.34 | 5.45 | 11.72 | 899.90  |
| VML031 | 0.122 | 0.29  | 2376.41 | 390.25 | 5.07  | 0.54 | 78.50 | 4.42 | 11.69 | 669.12  |
| VML032 | -0.23 | 0.821 | 2826.30 | 535.56 | 7.93  | 0.59 | 78.89 | 4.57 | 13.31 | 730.84  |
| VML033 | 0.093 | 0.888 | 2633.25 | 533.76 | 8.51  | 0.63 | 80.26 | 5.20 | 13.90 | 1001.87 |
| VML034 | -0.41 | 0.218 | 2626.15 | 531.14 | 8.48  | 0.63 | 82.13 | 4.46 | 11.77 | 776.46  |
| VML036 | 1.682 | 1.457 | 2405.34 | 411.94 | 5.59  | 0.55 | 79.66 | 4.77 | 12.01 | 763.04  |
| VML039 | -0.89 | -0.22 | 2236.77 | 485.63 | 8.56  | 0.67 | 81.87 | 4.47 | 11.00 | 642.29  |
| VML040 | -0.28 | 0.552 | 2842.65 | 529.82 | 7.75  | 0.59 | 77.29 | 4.75 | 11.16 | 639.60  |
| VML041 | 1.209 | 0.901 | 1846.01 | 321.04 | 4.62  | 0.59 | 89.50 | 5.55 | 10.89 | 811.34  |
| VML042 | 0.699 | 0.695 | 2354.33 | 466.39 | 7.39  | 0.62 | 75.01 | 5.15 | 12.52 | 843.54  |
| VML043 | -0.85 | -1    | 2443.94 | 423.54 | 5.82  | 0.56 | 78.66 | 3.62 | 9.80  | 467.86  |
| VML044 | 0.747 | 0.388 | 2383.65 | 417.35 | 5.82  | 0.56 | 81.18 | 4.51 | 11.11 | 604.72  |
| VML046 | 0.646 | 1.024 | 2788.47 | 550.47 | 8.50  | 0.61 | 84.19 | 5.12 | 11.50 | 773.77  |
| VML047 | 0.466 | -0.28 | 2118.44 | 374.27 | 5.37  | 0.58 | 76.48 | 3.83 | 8.66  | 516.16  |
| VML048 | -0.76 | -0.93 | 2152.34 | 354.65 | 4.69  | 0.54 | 83.92 | 3.87 | 8.95  | 408.83  |
| VML049 | -0.05 | -0.21 | 2026.52 | 350.20 | 4.90  | 0.57 | 84.44 | 4.70 | 8.52  | 612.77  |
| VML050 | -0.29 | -1    | 2516.12 | 463.20 | 6.73  | 0.58 | 76.32 | 3.71 | 9.32  | 689.25  |
| VML051 | -1.4  | -1.41 | 2440.70 | 471.08 | 7.22  | 0.61 | 80.40 | 3.60 | 8.79  | 510.80  |
| VML052 | -0.67 | 0.03  | 2259.00 | 486.03 | 8.43  | 0.66 | 84.59 | 4.19 | 15.28 | 867.69  |
| VML053 | 0.453 | 0.206 | 2187.14 | 443.93 | 7.29  | 0.64 | 79.46 | 4.81 | 12.41 | 738.89  |
| VML054 | -1.34 | -0.32 | 3037.31 | 617.95 | 9.86  | 0.62 | 73.05 | 4.05 | 9.83  | 669.12  |
| VML055 | -0.33 | 0.144 | 2458.08 | 395.76 | 5.02  | 0.53 | 87.73 | 4.28 | 12.38 | 827.44  |
| VML056 | 0.086 | -0.27 | 2162.64 | 403.95 | 6.09  | 0.60 | 90.57 | 4.04 | 11.82 | 588.62  |
| VML057 | 0.453 | -0.02 | 1911.86 | 351.17 | 5.30  | 0.60 | 82.46 | 4.71 | 10.31 | 580.57  |
| VML058 | -0.51 | -0.74 | 2350.03 | 440.03 | 6.63  | 0.60 | 84.76 | 4.10 | 11.29 | 744.26  |
| VML059 | 0.079 | 0.336 | 2381.41 | 438.99 | 6.43  | 0.59 | 81.74 | 4.40 | 10.60 | 800.61  |
| VML061 | -0.02 | -1.6  | 2075.89 | 351.82 | 4.83  | 0.56 | 79.07 | 3.67 | 8.87  | 430.29  |
| VML063 | 0.066 | 0.272 | 2157.47 | 399.16 | 5.94  | 0.59 | 86.91 | 5.05 | 9.80  | 717.42  |
| VML064 | 0.598 | 0.253 | 2122.09 | 380.35 | 5.54  | 0.58 | 76.83 | 4.65 | 9.88  | 693.27  |
| VML065 | 0.575 | -0.42 | 2025.27 | 337.62 | 4.56  | 0.55 | 88.28 | 4.04 | 9.88  | 556.42  |

|        |       |       |         |        |       |      |       |      |       |        |
|--------|-------|-------|---------|--------|-------|------|-------|------|-------|--------|
| VML066 | -0.65 | 0.026 | 2717.47 | 534.04 | 8.24  | 0.61 | 78.47 | 4.50 | 10.12 | 636.92 |
| VML067 | -1.26 | -1.13 | 2222.68 | 434.38 | 6.84  | 0.62 | 82.74 | 4.10 | 8.52  | 524.21 |
| VML068 | -0.17 | 0.543 | 2619.14 | 499.01 | 7.45  | 0.59 | 88.24 | 4.86 | 11.16 | 717.42 |
| VML069 | 1.064 | -0.11 | 1792.19 | 279.50 | 3.61  | 0.53 | 85.45 | 4.21 | 11.18 | 513.48 |
| VML070 | 0.279 | 0.244 | 2174.40 | 385.18 | 5.50  | 0.58 | 88.62 | 4.82 | 12.54 | 602.03 |
| VML073 | -1.27 | -0.25 | 2415.10 | 446.77 | 6.63  | 0.59 | 85.58 | 4.55 | 9.08  | 607.40 |
| VML074 | 1.423 | -0.03 | 1792.04 | 312.35 | 4.57  | 0.59 | 74.13 | 4.44 | 13.55 | 631.55 |
| VML075 | 0.671 | -0.22 | 2221.12 | 379.22 | 5.19  | 0.56 | 87.11 | 3.93 | 9.51  | 534.95 |
| VML076 | 0.036 | 1.351 | 2573.88 | 453.29 | 6.29  | 0.56 | 83.91 | 5.12 | 12.28 | 859.64 |
| VML080 | 0.546 | 0.259 | 2728.31 | 515.39 | 7.61  | 0.59 | 72.74 | 4.91 | 11.16 | 677.17 |
| VML081 | 0.108 | -0.69 | 1891.71 | 362.47 | 5.84  | 0.63 | 82.03 | 4.05 | 9.80  | 575.20 |
| VML083 | 0.305 | -0.83 | 1630.59 | 277.32 | 4.01  | 0.58 | 86.82 | 4.05 | 9.24  | 567.15 |
| VML084 | 0.16  | -0.58 | 1949.82 | 386.78 | 6.30  | 0.64 | 76.08 | 4.24 | 8.87  | 596.67 |
| VML085 | -0.65 | -0.05 | 2425.99 | 451.15 | 6.67  | 0.59 | 75.81 | 4.77 | 11.80 | 765.72 |
| VML086 | -1.29 | -1.22 | 1807.01 | 290.17 | 3.84  | 0.55 | 83.11 | 3.46 | 10.09 | 379.31 |
| VML087 | 0.843 | 0.446 | 2437.96 | 431.69 | 6.08  | 0.57 | 91.90 | 4.78 | 11.03 | 760.36 |
| VML088 | 1.55  | -0.1  | 1686.63 | 315.86 | 5.00  | 0.63 | 81.42 | 4.63 | 11.29 | 787.19 |
| VML089 | 0.627 | -0.34 | 2331.53 | 413.76 | 5.83  | 0.57 | 78.12 | 4.38 | 12.70 | 669.12 |
| VML090 | -1    | -0.75 | 2274.61 | 443.71 | 6.95  | 0.62 | 89.08 | 4.55 | 10.89 | 620.82 |
| VML091 | 0.302 | -0    | 2422.05 | 431.40 | 6.07  | 0.57 | 78.91 | 4.20 | 10.57 | 610.08 |
| VML092 | -0.06 | 0.272 | 2725.03 | 470.53 | 6.35  | 0.55 | 77.59 | 4.91 | 11.58 | 760.36 |
| VML093 | -0.48 | -0.25 | 2491.26 | 472.10 | 7.06  | 0.59 | 76.02 | 4.42 | 9.56  | 615.45 |
| VML094 | -1.03 | -1.08 | 2222.88 | 407.76 | 6.00  | 0.59 | 85.08 | 3.86 | 10.04 | 494.70 |
| VML095 | -0.51 | -0.7  | 2122.73 | 384.04 | 5.64  | 0.59 | 84.59 | 3.94 | 10.65 | 567.15 |
| VML096 | -0.53 | -0.41 | 2598.90 | 473.51 | 6.79  | 0.58 | 81.65 | 4.20 | 8.82  | 518.85 |
| VML097 | -0.11 | -0.04 | 2585.66 | 482.08 | 7.07  | 0.58 | 85.29 | 4.54 | 10.65 | 738.89 |
| VML099 | 1.124 | 0.208 | 2202.05 | 381.77 | 5.30  | 0.56 | 81.76 | 5.21 | 9.83  | 832.81 |
| VML100 | -0.54 | 0.134 | 2304.22 | 465.18 | 7.51  | 0.63 | 92.41 | 4.99 | 11.40 | 856.96 |
| VML102 | -0.86 | -0.01 | 2359.30 | 479.83 | 7.83  | 0.63 | 83.56 | 4.54 | 11.98 | 618.13 |
| VML104 | -1.15 | -0.78 | 2326.20 | 421.92 | 6.11  | 0.58 | 85.24 | 3.96 | 10.57 | 508.11 |
| VML106 | -0.79 | 0.665 | 2761.14 | 540.72 | 8.28  | 0.61 | 88.10 | 4.29 | 11.26 | 712.05 |
| VML107 | -0.9  | 0.014 | 2581.20 | 478.22 | 6.98  | 0.59 | 88.59 | 4.17 | 10.60 | 604.72 |
| VML110 | -1.29 | -0.52 | 2782.60 | 532.67 | 8.00  | 0.60 | 85.90 | 3.81 | 10.31 | 521.53 |
| VML111 | -0.81 | -0.81 | 2158.69 | 413.66 | 6.46  | 0.61 | 81.08 | 3.88 | 7.96  | 467.86 |
| VML112 | 0.443 | 0.459 | 2423.68 | 438.74 | 6.30  | 0.58 | 88.52 | 5.23 | 9.48  | 797.93 |
| VML113 | 0.659 | 0.781 | 2080.38 | 369.54 | 5.31  | 0.58 | 80.25 | 5.03 | 14.30 | 704.00 |
| VML114 | 0.53  | 0.901 | 2536.70 | 511.77 | 8.15  | 0.62 | 73.73 | 5.35 | 11.29 | 720.11 |
| VML116 | -0.67 | -1.08 | 2071.46 | 366.95 | 5.29  | 0.58 | 86.20 | 3.68 | 8.60  | 465.18 |
| VML117 | -1.23 | -0.3  | 2816.55 | 534.72 | 7.90  | 0.59 | 78.85 | 4.47 | 12.41 | 593.98 |
| VML118 | -0.03 | 1.294 | 2614.49 | 578.74 | 10.16 | 0.67 | 93.41 | 5.47 | 10.84 | 945.51 |
| VML119 | 1.596 | 0.995 | 2203.94 | 366.35 | 4.88  | 0.55 | 89.29 | 4.62 | 11.03 | 626.18 |
| VML120 | 0.595 | -0.55 | 1858.38 | 341.05 | 5.24  | 0.60 | 75.91 | 4.21 | 12.09 | 615.45 |
| VML121 | 1.634 | 1.355 | 2021.24 | 361.25 | 5.26  | 0.59 | 80.40 | 5.61 | 12.36 | 956.25 |
| VML122 | -0.24 | -0.56 | 2378.40 | 397.21 | 5.31  | 0.55 | 84.89 | 3.92 | 11.69 | 483.96 |

|        |       |       |         |        |       |      |       |      |       |        |
|--------|-------|-------|---------|--------|-------|------|-------|------|-------|--------|
| VML123 | -0.13 | 0.668 | 2558.85 | 486.98 | 7.30  | 0.60 | 89.84 | 4.83 | 13.55 | 867.69 |
| VML124 | -0.07 | -0.78 | 1961.70 | 323.91 | 4.37  | 0.55 | 84.46 | 3.65 | 9.11  | 398.09 |
| VML125 | -0.97 | -1.23 | 1918.73 | 377.40 | 6.12  | 0.63 | 86.14 | 4.25 | 5.33  | 457.13 |
| VML126 | -0.07 | 0.357 | 2424.01 | 429.82 | 6.02  | 0.57 | 89.19 | 4.81 | 12.30 | 881.11 |
| VML127 | -0.99 | -0.97 | 2266.13 | 465.62 | 7.72  | 0.64 | 78.17 | 3.86 | 11.16 | 521.53 |
| VML128 | 0.235 | 0.289 | 1864.65 | 335.52 | 4.98  | 0.59 | 88.29 | 4.30 | 11.85 | 671.80 |
| VML129 | -1.02 | -1.17 | 2347.29 | 446.57 | 6.78  | 0.60 | 79.05 | 3.57 | 9.45  | 470.55 |
| VML130 | 1.402 | 0.427 | 1896.20 | 329.21 | 4.69  | 0.58 | 80.06 | 4.35 | 11.45 | 545.68 |
| VML131 | 0.273 | 0.326 | 3043.21 | 577.50 | 8.45  | 0.58 | 79.13 | 4.45 | 10.81 | 588.62 |
| VML132 | -1.29 | -1.06 | 2078.61 | 394.71 | 6.08  | 0.61 | 86.31 | 3.76 | 10.25 | 537.63 |
| VML133 | 1.505 | 0.57  | 2097.69 | 394.64 | 6.02  | 0.61 | 78.83 | 4.72 | 9.06  | 642.29 |
| VML134 | -1.4  | 0.382 | 3079.35 | 571.95 | 8.19  | 0.58 | 91.61 | 4.81 | 12.01 | 674.49 |
| VML136 | 0.439 | 0.263 | 1730.42 | 372.10 | 6.79  | 0.70 | 82.88 | 4.76 | 9.69  | 811.34 |
| VML137 | 1.737 | 0.936 | 1876.74 | 306.30 | 4.11  | 0.55 | 87.41 | 5.51 | 9.93  | 768.41 |
| VML138 | -1.14 | -0.54 | 3050.65 | 525.62 | 6.97  | 0.55 | 80.85 | 4.05 | 9.19  | 577.88 |
| VML139 | -0.13 | 0.237 | 1894.84 | 364.00 | 5.76  | 0.62 | 83.82 | 5.00 | 11.48 | 851.59 |
| VML140 | -0.63 | 0.396 | 3279.28 | 718.97 | 12.13 | 0.65 | 80.74 | 4.75 | 13.61 | 693.27 |
| VML141 | -0.86 | -0.18 | 2683.21 | 440.17 | 5.65  | 0.53 | 83.82 | 4.17 | 11.96 | 722.79 |
| VML143 | -0.05 | 0.435 | 2285.41 | 448.90 | 7.11  | 0.63 | 77.69 | 5.08 | 10.71 | 757.67 |
| VML144 | -1.31 | 1.153 | 3272.06 | 686.29 | 11.05 | 0.63 | 84.16 | 4.67 | 13.34 | 814.03 |
| VML145 | 0.831 | -0.02 | 1855.51 | 319.26 | 4.53  | 0.58 | 84.59 | 4.88 | 11.85 | 722.79 |
| VML146 | 0.578 | 0.296 | 2292.63 | 401.66 | 5.62  | 0.57 | 83.39 | 4.36 | 13.85 | 695.95 |
| VML147 | -0.39 | -0.09 | 2442.65 | 427.46 | 5.93  | 0.56 | 82.09 | 4.66 | 12.70 | 647.65 |
| VML148 | 0.696 | 0.343 | 1825.21 | 337.57 | 5.21  | 0.62 | 78.42 | 4.55 | 12.81 | 693.27 |
| VML150 | 0.07  | 0.265 | 2230.38 | 405.80 | 5.97  | 0.59 | 85.98 | 4.42 | 11.18 | 585.93 |
| VML151 | -0.13 | 0.669 | 2480.65 | 479.87 | 7.34  | 0.61 | 78.47 | 5.23 | 9.69  | 779.14 |
| VML152 | 2.076 | -0.3  | 1554.30 | 226.30 | 2.81  | 0.51 | 79.72 | 4.14 | 12.89 | 526.90 |
| VML153 | 2.37  | 0.595 | 1772.29 | 268.04 | 3.40  | 0.52 | 82.32 | 4.99 | 13.16 | 744.26 |
| VML154 | -1.32 | 0.225 | 2463.51 | 493.12 | 7.86  | 0.62 | 89.21 | 4.72 | 12.14 | 604.72 |
| VML155 | -0.3  | 0.866 | 2258.28 | 417.82 | 6.25  | 0.58 | 91.29 | 4.82 | 13.18 | 771.09 |
| VML156 | 0.483 | -0.65 | 2233.26 | 369.23 | 4.87  | 0.54 | 83.02 | 4.21 | 10.71 | 561.78 |
| VML157 | 0.646 | 0.425 | 2347.79 | 434.73 | 6.45  | 0.59 | 79.50 | 4.61 | 10.01 | 628.87 |
| VML158 | 2.696 | -0.44 | 1343.05 | 203.81 | 2.73  | 0.55 | 79.10 | 4.35 | 12.25 | 567.15 |
| VML159 | 0.18  | 0.348 | 2185.76 | 408.06 | 6.16  | 0.60 | 84.17 | 5.19 | 11.40 | 795.24 |
| VML160 | 0.082 | 0.186 | 2406.28 | 472.76 | 7.41  | 0.61 | 77.61 | 4.86 | 10.28 | 830.13 |
| VML161 | 0.135 | -0.2  | 2027.13 | 370.94 | 5.53  | 0.59 | 94.63 | 4.49 | 12.17 | 690.59 |
| VML162 | -0.83 | -1.28 | 2384.65 | 421.73 | 5.91  | 0.57 | 76.49 | 3.99 | 8.95  | 478.60 |
| VML164 | 0.011 | -0.15 | 2155.17 | 410.09 | 6.29  | 0.61 | 80.52 | 4.39 | 11.53 | 669.12 |
| VML165 | 1.223 | 0.95  | 2339.90 | 416.34 | 5.92  | 0.58 | 87.10 | 5.56 | 9.96  | 875.74 |
| VML168 | 0.02  | -0.17 | 1972.76 | 362.01 | 5.45  | 0.60 | 86.83 | 4.66 | 12.41 | 569.83 |
| VML170 | -0.41 | -0.72 | 1907.91 | 366.16 | 5.81  | 0.62 | 78.72 | 3.46 | 12.22 | 567.15 |
| VML171 | 0.629 | -0.27 | 2163.75 | 383.96 | 5.53  | 0.58 | 80.71 | 4.79 | 9.40  | 618.13 |
| VML173 | -1.17 | -0.24 | 2785.36 | 582.60 | 9.56  | 0.63 | 84.46 | 4.05 | 11.29 | 607.40 |
| VML174 | 1.345 | 0.882 | 1913.76 | 339.20 | 4.95  | 0.58 | 81.49 | 5.24 | 11.88 | 779.14 |

|        |       |       |         |        |      |      |       |      |       |        |
|--------|-------|-------|---------|--------|------|------|-------|------|-------|--------|
| VML175 | -1.45 | -1.05 | 2280.69 | 402.62 | 5.70 | 0.57 | 84.82 | 3.75 | 10.79 | 604.72 |
| VML176 | 0.047 | 0.289 | 2471.69 | 515.80 | 8.58 | 0.65 | 80.10 | 4.68 | 12.28 | 862.33 |
| VML178 | -1.39 | -0.03 | 2163.26 | 454.69 | 7.80 | 0.66 | 88.03 | 4.49 | 11.11 | 733.52 |
| VML179 | 1.051 | 0.801 | 2142.64 | 352.36 | 4.73 | 0.55 | 88.28 | 5.10 | 10.81 | 653.02 |
| VML180 | 0.117 | -0.59 | 1989.09 | 358.59 | 5.27 | 0.59 | 84.96 | 4.61 | 9.11  | 682.54 |
| VML183 | 0.817 | 0.349 | 2286.88 | 399.17 | 5.55 | 0.57 | 79.10 | 4.31 | 12.38 | 666.44 |
| VML184 | 1.045 | -0.33 | 2186.49 | 376.04 | 5.18 | 0.56 | 77.05 | 4.23 | 10.41 | 634.24 |
| VML188 | -0.94 | -0.16 | 2488.81 | 510.39 | 8.31 | 0.63 | 86.65 | 4.98 | 10.31 | 838.18 |

**Non-applied phosphorus**

| <b>Inbred Lines</b> | <b>LPTI</b> | <b>LPPI</b> | <b>RDW</b> | <b>RSR</b> | <b>TDW</b> | <b>DG</b> | <b>LRL</b> | <b>TRL</b> | <b>RSA</b> | <b>RV</b> |
|---------------------|-------------|-------------|------------|------------|------------|-----------|------------|------------|------------|-----------|
| VML001              | 1.318       | 0.999       | 415.76     | 0.58       | 1130.56    | 0.36      | 1647.33    | 2229.32    | 330.76     | 3.91      |
| VML002              | 3.139       | 0.491       | 303.91     | 0.59       | 847.00     | 0.35      | 1215.18    | 1681.53    | 238.49     | 2.70      |
| VML003              | 0.454       | 0.98        | 440.93     | 0.60       | 1178.72    | 0.38      | 1396.46    | 1991.23    | 331.88     | 4.41      |
| VML004              | 0.78        | 1.105       | 508.04     | 0.59       | 1371.32    | 0.36      | 992.40     | 1617.17    | 307.23     | 4.70      |
| VML005              | 0.367       | 0.071       | 320.69     | 0.42       | 1085.09    | 0.35      | 953.19     | 1395.09    | 237.67     | 3.25      |
| VML006              | -0.52       | -1.09       | 303.91     | 0.53       | 892.48     | 0.28      | 650.85     | 1108.41    | 213.09     | 3.33      |
| VML007              | -0.26       | 0.835       | 415.76     | 0.53       | 1192.09    | 0.25      | 1615.29    | 2219.48    | 344.82     | 4.28      |
| VML008              | -0.45       | 0.311       | 407.37     | 0.56       | 1151.96    | 0.29      | 1192.28    | 1790.43    | 320.21     | 4.61      |
| VML009              | 0.995       | 0.628       | 505.24     | 0.72       | 1210.82    | 0.23      | 1028.38    | 1550.91    | 280.30     | 4.18      |
| VML010              | -1.22       | -0.78       | 275.95     | 0.48       | 855.03     | 0.27      | 772.07     | 1187.33    | 203.16     | 2.80      |
| VML011              | -0.32       | 0.246       | 371.02     | 0.59       | 1002.16    | 0.30      | 1192.50    | 1798.92    | 305.26     | 4.13      |
| VML012              | -1.54       | -0.55       | 295.52     | 0.53       | 849.68     | 0.28      | 983.98     | 1430.17    | 223.82     | 2.80      |
| VML015              | -1.16       | -0.84       | 329.08     | 0.57       | 913.88     | 0.30      | 630.22     | 1068.29    | 208.11     | 3.33      |
| VML016              | -1.32       | 0.534       | 362.63     | 0.53       | 1058.34    | 0.29      | 1324.06    | 1837.97    | 268.35     | 3.13      |
| VML017              | -0.9        | -0.78       | 371.02     | 0.62       | 986.11     | 0.24      | 859.69     | 1411.84    | 274.66     | 4.32      |
| VML018              | 0.305       | -0.14       | 348.65     | 0.64       | 919.23     | 0.28      | 1153.20    | 1660.92    | 266.93     | 3.42      |
| VML020              | 0.705       | -0.38       | 351.45     | 0.57       | 970.06     | 0.31      | 878.79     | 1434.42    | 266.94     | 4.00      |
| VML021              | -1.02       | -0.77       | 267.56     | 0.51       | 801.53     | 0.23      | 933.64     | 1345.69    | 208.56     | 2.58      |
| VML022              | -1.28       | 0.266       | 410.17     | 0.59       | 1122.54    | 0.28      | 1133.79    | 1702.55    | 281.03     | 3.72      |
| VML023              | -0.33       | 0.331       | 382.21     | 0.56       | 1061.01    | 0.30      | 1226.74    | 1787.02    | 290.23     | 3.77      |
| VML024              | -0.81       | 0.381       | 396.19     | 0.46       | 1269.67    | 0.29      | 1275.46    | 1853.24    | 298.68     | 3.83      |
| VML025              | -0.54       | -1.4        | 273.15     | 0.60       | 769.43     | 0.26      | 586.47     | 1030.69    | 192.05     | 2.90      |
| VML026              | 0.016       | 0.245       | 376.62     | 0.56       | 1047.64    | 0.30      | 1216.94    | 1795.55    | 284.63     | 3.59      |
| VML027              | -0.18       | 0.545       | 385.00     | 0.57       | 1063.69    | 0.33      | 1141.33    | 1704.06    | 300.08     | 4.25      |
| VML028              | 0.908       | -0.5        | 275.95     | 0.41       | 948.66     | 0.38      | 839.91     | 1329.34    | 232.77     | 3.26      |
| VML030              | 1.539       | 1.299       | 508.04     | 0.56       | 1400.75    | 0.35      | 1195.23    | 1776.24    | 319.57     | 4.60      |
| VML031              | 0.122       | 0.29        | 329.08     | 0.50       | 999.48     | 0.34      | 1255.02    | 1714.95    | 261.00     | 3.18      |
| VML032              | -0.23       | 0.821       | 387.80     | 0.53       | 1117.19    | 0.40      | 1404.55    | 1994.54    | 321.90     | 4.16      |
| VML033              | 0.093       | 0.888       | 443.73     | 0.44       | 1440.87    | 0.40      | 991.55     | 1590.21    | 304.57     | 4.70      |
| VML034              | -0.41       | 0.218       | 393.39     | 0.51       | 1168.02    | 0.32      | 1167.75    | 1776.81    | 309.28     | 4.32      |
| VML036              | 1.682       | 1.457       | 438.13     | 0.57       | 1197.44    | 0.38      | 1829.22    | 2473.67    | 366.28     | 4.31      |
| VML039              | -0.89       | -0.22       | 348.65     | 0.54       | 991.46     | 0.29      | 950.93     | 1488.13    | 260.39     | 3.65      |
| VML040              | -0.28       | 0.552       | 354.25     | 0.56       | 994.13     | 0.33      | 1509.95    | 2144.57    | 335.02     | 4.18      |
| VML041              | 1.209       | 0.901       | 393.39     | 0.48       | 1202.79    | 0.32      | 1110.24    | 1569.32    | 262.60     | 3.51      |



|        |       |       |        |      |         |      |         |         |        |      |
|--------|-------|-------|--------|------|---------|------|---------|---------|--------|------|
| VML042 | 0.699 | 0.695 | 432.54 | 0.51 | 1272.34 | 0.34 | 1094.55 | 1722.14 | 333.21 | 5.20 |
| VML043 | -0.85 | -1    | 278.75 | 0.62 | 750.70  | 0.26 | 961.90  | 1452.01 | 233.00 | 2.98 |
| VML044 | 0.747 | 0.388 | 362.63 | 0.62 | 967.38  | 0.32 | 1389.06 | 1964.99 | 310.67 | 3.92 |
| VML046 | 0.646 | 1.024 | 536.00 | 0.69 | 1301.77 | 0.31 | 1136.90 | 1750.29 | 326.92 | 4.94 |
| VML047 | 0.466 | -0.28 | 432.54 | 0.90 | 945.98  | 0.24 | 1212.00 | 1861.92 | 329.55 | 4.66 |
| VML048 | -0.76 | -0.93 | 231.21 | 0.63 | 646.37  | 0.25 | 899.99  | 1262.95 | 186.52 | 2.20 |
| VML049 | -0.05 | -0.21 | 326.28 | 0.54 | 940.63  | 0.24 | 1017.10 | 1463.03 | 237.27 | 3.07 |
| VML050 | -0.29 | -1    | 405.98 | 0.59 | 1093.11 | 0.27 | 912.80  | 1455.43 | 279.22 | 4.34 |
| VML051 | -1.4  | -1.41 | 275.95 | 0.59 | 790.83  | 0.24 | 806.21  | 1270.69 | 223.56 | 3.18 |
| VML052 | -0.67 | 0.03  | 298.32 | 0.34 | 1168.02 | 0.41 | 946.12  | 1368.25 | 227.37 | 3.04 |
| VML053 | 0.453 | 0.206 | 404.58 | 0.56 | 1141.26 | 0.33 | 770.98  | 1266.64 | 243.13 | 3.79 |
| VML054 | -1.34 | -0.32 | 368.23 | 0.55 | 1036.94 | 0.26 | 1253.99 | 1951.92 | 331.96 | 4.50 |
| VML055 | -0.33 | 0.144 | 301.12 | 0.37 | 1130.56 | 0.34 | 1314.53 | 1795.15 | 259.33 | 3.01 |
| VML056 | 0.086 | -0.27 | 357.04 | 0.64 | 945.98  | 0.32 | 992.32  | 1559.41 | 272.93 | 3.82 |
| VML057 | 0.453 | -0.02 | 398.99 | 0.71 | 978.08  | 0.29 | 812.35  | 1341.33 | 250.30 | 3.80 |
| VML058 | -0.51 | -0.74 | 323.49 | 0.43 | 1069.04 | 0.30 | 788.16  | 1304.01 | 238.46 | 3.52 |
| VML059 | 0.079 | 0.336 | 438.13 | 0.54 | 1234.89 | 0.28 | 1171.25 | 1709.68 | 291.34 | 4.00 |
| VML061 | -0.02 | -1.6  | 270.36 | 0.68 | 705.22  | 0.24 | 595.73  | 1026.65 | 191.97 | 2.99 |
| VML063 | 0.066 | 0.272 | 385.00 | 0.55 | 1101.14 | 0.27 | 1056.68 | 1550.87 | 264.10 | 3.65 |
| VML064 | 0.598 | 0.253 | 376.62 | 0.55 | 1069.04 | 0.31 | 1250.15 | 1799.99 | 294.43 | 3.84 |
| VML065 | 0.575 | -0.42 | 323.49 | 0.59 | 881.78  | 0.30 | 1161.28 | 1689.61 | 276.94 | 3.62 |
| VML066 | -0.65 | 0.026 | 382.21 | 0.61 | 1018.21 | 0.28 | 1204.19 | 1796.35 | 309.22 | 4.27 |
| VML067 | -1.26 | -1.13 | 273.15 | 0.53 | 801.53  | 0.23 | 831.58  | 1251.89 | 215.85 | 2.99 |
| VML068 | -0.17 | 0.543 | 424.15 | 0.59 | 1138.59 | 0.31 | 1137.72 | 1671.81 | 291.42 | 4.06 |
| VML069 | 1.064 | -0.11 | 306.71 | 0.61 | 822.93  | 0.33 | 1086.77 | 1530.35 | 239.01 | 2.98 |
| VML070 | 0.279 | 0.244 | 301.12 | 0.50 | 905.86  | 0.37 | 1065.95 | 1569.38 | 250.41 | 3.19 |
| VML073 | -1.27 | -0.25 | 295.52 | 0.48 | 905.86  | 0.24 | 1094.12 | 1532.26 | 230.71 | 2.77 |
| VML074 | 1.423 | -0.03 | 317.89 | 0.50 | 951.33  | 0.41 | 866.33  | 1413.50 | 252.27 | 3.62 |
| VML075 | 0.671 | -0.22 | 418.56 | 0.82 | 951.33  | 0.29 | 1081.96 | 1678.23 | 299.13 | 4.27 |
| VML076 | 0.036 | 1.351 | 488.47 | 0.57 | 1341.90 | 0.34 | 1342.58 | 1937.15 | 315.47 | 4.10 |
| VML080 | 0.546 | 0.259 | 379.41 | 0.56 | 1055.66 | 0.31 | 1106.79 | 1729.37 | 306.95 | 4.36 |
| VML081 | 0.108 | -0.69 | 354.25 | 0.63 | 929.93  | 0.27 | 892.20  | 1470.69 | 274.69 | 4.15 |
| VML083 | 0.305 | -0.83 | 278.75 | 0.49 | 849.68  | 0.29 | 861.50  | 1296.47 | 213.12 | 2.81 |
| VML084 | 0.16  | -0.58 | 354.25 | 0.62 | 951.33  | 0.24 | 1030.52 | 1604.97 | 288.02 | 4.15 |
| VML085 | -0.65 | -0.05 | 312.30 | 0.40 | 1079.74 | 0.32 | 1013.07 | 1521.68 | 253.38 | 3.37 |
| VML086 | -1.29 | -1.22 | 192.06 | 0.55 | 579.49  | 0.27 | 875.86  | 1220.01 | 170.78 | 1.93 |
| VML087 | 0.843 | 0.446 | 468.89 | 0.62 | 1224.19 | 0.30 | 992.66  | 1547.65 | 288.41 | 4.48 |
| VML088 | 1.55  | -0.1  | 404.58 | 0.51 | 1189.42 | 0.30 | 836.13  | 1401.88 | 274.59 | 4.37 |
| VML089 | 0.627 | -0.34 | 340.26 | 0.51 | 1010.18 | 0.35 | 715.60  | 1190.36 | 228.90 | 3.58 |
| VML090 | -1    | -0.75 | 253.58 | 0.41 | 879.10  | 0.29 | 726.86  | 1115.88 | 194.42 | 2.72 |
| VML091 | 0.302 | -0    | 393.39 | 0.65 | 1002.16 | 0.29 | 1044.75 | 1571.38 | 266.52 | 3.63 |
| VML092 | -0.06 | 0.272 | 345.86 | 0.45 | 1106.49 | 0.31 | 1017.53 | 1506.00 | 248.42 | 3.28 |
| VML093 | -0.48 | -0.25 | 382.21 | 0.64 | 996.81  | 0.25 | 1022.94 | 1594.67 | 283.50 | 4.06 |
| VML094 | -1.03 | -1.08 | 247.99 | 0.50 | 748.03  | 0.27 | 831.31  | 1260.53 | 201.20 | 2.56 |

|        |       |       |        |      |         |      |         |         |        |      |
|--------|-------|-------|--------|------|---------|------|---------|---------|--------|------|
| VML095 | -0.51 | -0.7  | 315.10 | 0.56 | 884.46  | 0.30 | 941.41  | 1505.89 | 256.31 | 3.51 |
| VML096 | -0.53 | -0.41 | 345.86 | 0.70 | 865.73  | 0.24 | 992.05  | 1465.18 | 242.16 | 3.20 |
| VML097 | -0.11 | -0.04 | 382.21 | 0.52 | 1119.86 | 0.28 | 1057.64 | 1603.21 | 284.48 | 4.04 |
| VML099 | 1.124 | 0.208 | 396.19 | 0.48 | 1226.87 | 0.29 | 910.62  | 1477.53 | 270.72 | 3.98 |
| VML100 | -0.54 | 0.134 | 362.63 | 0.42 | 1218.84 | 0.32 | 926.65  | 1457.66 | 258.41 | 3.67 |
| VML102 | -0.86 | -0.01 | 340.26 | 0.57 | 959.36  | 0.32 | 1021.49 | 1554.51 | 266.19 | 3.64 |
| VML104 | -1.15 | -0.78 | 287.14 | 0.58 | 798.85  | 0.28 | 755.68  | 1176.10 | 199.53 | 2.72 |
| VML106 | -0.79 | 0.665 | 480.08 | 0.69 | 1186.74 | 0.30 | 1363.13 | 1951.11 | 324.64 | 4.31 |
| VML107 | -0.9  | 0.014 | 359.84 | 0.61 | 964.71  | 0.28 | 1222.83 | 1776.22 | 274.93 | 3.40 |
| VML110 | -1.29 | -0.52 | 337.47 | 0.68 | 860.38  | 0.27 | 991.61  | 1438.60 | 240.72 | 3.23 |
| VML111 | -0.81 | -0.81 | 323.49 | 0.73 | 793.50  | 0.21 | 987.04  | 1444.40 | 238.41 | 3.15 |
| VML112 | 0.443 | 0.459 | 440.93 | 0.55 | 1234.89 | 0.26 | 1057.31 | 1617.41 | 291.57 | 4.21 |
| VML113 | 0.659 | 0.781 | 385.00 | 0.55 | 1087.76 | 0.38 | 1086.70 | 1617.28 | 282.99 | 3.97 |
| VML114 | 0.53  | 0.901 | 468.89 | 0.65 | 1184.07 | 0.31 | 1187.06 | 1934.15 | 379.34 | 5.99 |
| VML116 | -0.67 | -1.08 | 306.71 | 0.70 | 774.78  | 0.23 | 848.68  | 1307.25 | 222.77 | 3.04 |
| VML117 | -1.23 | -0.3  | 259.17 | 0.44 | 857.70  | 0.33 | 931.91  | 1377.36 | 217.31 | 2.73 |
| VML118 | -0.03 | 1.294 | 552.78 | 0.58 | 1489.03 | 0.29 | 1301.20 | 1952.70 | 357.49 | 5.29 |
| VML119 | 1.596 | 0.995 | 499.65 | 0.82 | 1119.86 | 0.32 | 1406.66 | 1987.62 | 334.78 | 4.50 |
| VML120 | 0.595 | -0.55 | 284.34 | 0.46 | 903.18  | 0.36 | 760.58  | 1217.81 | 215.46 | 3.06 |
| VML121 | 1.634 | 1.355 | 485.67 | 0.50 | 1435.52 | 0.35 | 1228.44 | 1842.59 | 327.98 | 4.67 |
| VML122 | -0.24 | -0.56 | 270.36 | 0.57 | 758.73  | 0.32 | 1098.37 | 1561.25 | 244.86 | 3.07 |
| VML123 | -0.13 | 0.668 | 382.21 | 0.44 | 1248.27 | 0.37 | 1055.68 | 1558.51 | 260.15 | 3.46 |
| VML124 | -0.07 | -0.78 | 278.75 | 0.76 | 681.15  | 0.25 | 870.15  | 1271.03 | 195.80 | 2.41 |
| VML125 | -0.97 | -1.23 | 306.71 | 0.71 | 766.75  | 0.14 | 688.08  | 1159.01 | 203.90 | 2.88 |
| VML126 | -0.07 | 0.357 | 351.45 | 0.40 | 1232.22 | 0.33 | 966.52  | 1444.73 | 236.03 | 3.08 |
| VML127 | -0.99 | -0.97 | 259.17 | 0.52 | 785.48  | 0.30 | 915.01  | 1381.06 | 231.64 | 3.12 |
| VML128 | 0.235 | 0.289 | 337.47 | 0.56 | 1010.18 | 0.32 | 1203.74 | 1701.20 | 259.14 | 3.14 |
| VML129 | -1.02 | -1.17 | 261.97 | 0.61 | 737.33  | 0.25 | 859.18  | 1287.88 | 207.18 | 2.66 |
| VML130 | 1.402 | 0.427 | 357.04 | 0.67 | 903.18  | 0.39 | 1388.45 | 1938.58 | 311.38 | 4.00 |
| VML131 | 0.273 | 0.326 | 443.73 | 0.78 | 1028.91 | 0.29 | 1197.78 | 1766.57 | 321.19 | 4.69 |
| VML132 | -1.29 | -1.06 | 250.78 | 0.48 | 793.50  | 0.28 | 977.09  | 1440.80 | 228.78 | 2.91 |
| VML133 | 1.505 | 0.57  | 524.82 | 0.83 | 1159.99 | 0.27 | 1132.24 | 1737.98 | 317.28 | 4.71 |
| VML134 | -1.4  | 0.382 | 331.88 | 0.50 | 1007.51 | 0.32 | 1210.96 | 1699.84 | 267.03 | 3.34 |
| VML136 | 0.439 | 0.263 | 552.78 | 0.68 | 1355.27 | 0.26 | 855.17  | 1479.47 | 308.30 | 5.23 |
| VML137 | 1.737 | 0.936 | 371.02 | 0.48 | 1138.59 | 0.29 | 1482.44 | 2069.24 | 315.17 | 3.82 |
| VML138 | -1.14 | -0.54 | 303.91 | 0.53 | 884.46  | 0.25 | 1231.40 | 1730.54 | 266.37 | 3.28 |
| VML139 | -0.13 | 0.237 | 345.86 | 0.40 | 1197.44 | 0.31 | 912.94  | 1351.83 | 231.97 | 3.19 |
| VML140 | -0.63 | 0.396 | 379.41 | 0.55 | 1071.71 | 0.36 | 1054.53 | 1717.01 | 311.27 | 4.52 |
| VML141 | -0.86 | -0.18 | 275.95 | 0.38 | 1002.16 | 0.32 | 1299.67 | 1789.45 | 259.99 | 3.02 |
| VML143 | -0.05 | 0.435 | 390.60 | 0.51 | 1146.61 | 0.30 | 1110.26 | 1640.30 | 284.01 | 3.93 |
| VML144 | -1.31 | 1.153 | 471.69 | 0.60 | 1280.37 | 0.38 | 1419.62 | 2086.59 | 342.31 | 4.47 |
| VML145 | 0.831 | -0.02 | 289.93 | 0.40 | 1015.53 | 0.32 | 680.07  | 1058.82 | 184.18 | 2.57 |
| VML146 | 0.578 | 0.296 | 348.65 | 0.50 | 1044.96 | 0.39 | 1102.59 | 1664.20 | 275.85 | 3.64 |
| VML147 | -0.39 | -0.09 | 284.34 | 0.43 | 935.28  | 0.35 | 992.02  | 1489.78 | 243.06 | 3.16 |

|        |       |       |        |      |         |      |         |         |        |      |
|--------|-------|-------|--------|------|---------|------|---------|---------|--------|------|
| VML148 | 0.696 | 0.343 | 371.02 | 0.55 | 1063.69 | 0.36 | 959.40  | 1471.37 | 249.88 | 3.39 |
| VML150 | 0.07  | 0.265 | 385.00 | 0.67 | 970.06  | 0.30 | 1224.76 | 1757.57 | 290.13 | 3.82 |
| VML151 | -0.13 | 0.669 | 412.97 | 0.53 | 1189.42 | 0.26 | 1406.82 | 2010.60 | 337.95 | 4.53 |
| VML152 | 2.076 | -0.3  | 234.01 | 0.44 | 766.75  | 0.41 | 980.84  | 1399.45 | 210.25 | 2.52 |
| VML153 | 2.37  | 0.595 | 303.91 | 0.41 | 1050.31 | 0.43 | 1029.38 | 1529.01 | 237.12 | 2.93 |
| VML154 | -1.32 | 0.225 | 323.49 | 0.54 | 929.93  | 0.32 | 1145.92 | 1629.15 | 261.17 | 3.36 |
| VML155 | -0.3  | 0.866 | 379.41 | 0.49 | 1149.29 | 0.36 | 1254.31 | 1759.87 | 272.72 | 3.37 |
| VML156 | 0.483 | -0.65 | 273.15 | 0.48 | 838.98  | 0.33 | 863.87  | 1325.73 | 222.18 | 2.97 |
| VML157 | 0.646 | 0.425 | 426.95 | 0.69 | 1052.99 | 0.30 | 1272.58 | 1824.28 | 317.93 | 4.43 |
| VML158 | 2.696 | -0.44 | 239.60 | 0.43 | 812.23  | 0.42 | 773.22  | 1200.25 | 199.13 | 2.66 |
| VML159 | 0.18  | 0.348 | 320.69 | 0.40 | 1117.19 | 0.32 | 965.50  | 1397.49 | 228.82 | 3.01 |
| VML160 | 0.082 | 0.186 | 398.99 | 0.47 | 1226.87 | 0.29 | 1138.42 | 1724.69 | 312.82 | 4.60 |
| VML161 | 0.135 | -0.2  | 351.45 | 0.51 | 1042.29 | 0.32 | 710.62  | 1147.44 | 215.53 | 3.28 |
| VML162 | -0.83 | -1.28 | 264.77 | 0.57 | 748.03  | 0.24 | 696.69  | 1133.73 | 200.85 | 2.86 |
| VML164 | 0.011 | -0.15 | 373.82 | 0.57 | 1042.29 | 0.31 | 931.35  | 1494.98 | 272.20 | 3.99 |
| VML165 | 1.223 | 0.95  | 502.45 | 0.57 | 1371.32 | 0.28 | 1038.16 | 1604.57 | 292.67 | 4.31 |
| VML168 | 0.02  | -0.17 | 301.12 | 0.53 | 873.75  | 0.35 | 784.65  | 1201.48 | 214.57 | 3.09 |
| VML170 | -0.41 | -0.72 | 301.12 | 0.54 | 871.08  | 0.33 | 1031.60 | 1544.92 | 254.88 | 3.36 |
| VML171 | 0.629 | -0.27 | 329.08 | 0.54 | 948.66  | 0.27 | 963.25  | 1489.68 | 263.91 | 3.76 |
| VML173 | -1.17 | -0.24 | 376.62 | 0.63 | 983.43  | 0.30 | 1050.25 | 1604.16 | 284.04 | 4.03 |
| VML174 | 1.345 | 0.882 | 410.17 | 0.53 | 1186.74 | 0.37 | 1152.01 | 1712.76 | 293.58 | 4.02 |
| VML175 | -1.45 | -1.05 | 228.41 | 0.38 | 838.98  | 0.29 | 983.74  | 1384.74 | 208.40 | 2.50 |
| VML176 | 0.047 | 0.289 | 385.00 | 0.44 | 1245.59 | 0.33 | 1138.66 | 1711.72 | 300.73 | 4.23 |
| VML178 | -1.39 | -0.03 | 348.65 | 0.48 | 1082.41 | 0.30 | 938.36  | 1396.11 | 233.57 | 3.13 |
| VML179 | 1.051 | 0.801 | 410.17 | 0.64 | 1061.01 | 0.33 | 1127.82 | 1642.43 | 272.18 | 3.60 |
| VML180 | 0.117 | -0.59 | 320.69 | 0.47 | 1004.83 | 0.25 | 711.92  | 1116.44 | 203.62 | 3.01 |
| VML183 | 0.817 | 0.349 | 385.00 | 0.59 | 1050.31 | 0.36 | 1136.26 | 1714.22 | 287.35 | 3.85 |
| VML184 | 1.045 | -0.33 | 354.25 | 0.58 | 988.78  | 0.29 | 1089.27 | 1614.86 | 276.58 | 3.78 |
| VML188 | -0.94 | -0.16 | 379.41 | 0.46 | 1216.17 | 0.28 | 737.43  | 1285.94 | 254.45 | 4.10 |

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#### Non-applied phosphorus

| Inbred Lines | LPTI  | LPPI  | RAD  | RTD    |
|--------------|-------|-------|------|--------|
| VML001       | 1.318 | 0.999 | 0.47 | 106.14 |
| VML002       | 3.139 | 0.491 | 0.45 | 114.87 |
| VML003       | 0.454 | 0.98  | 0.53 | 99.22  |
| VML004       | 0.78  | 1.105 | 0.60 | 107.97 |
| VML005       | 0.367 | 0.071 | 0.54 | 101.26 |
| VML006       | -0.52 | -1.09 | 0.64 | 91.23  |
| VML007       | -0.26 | 0.835 | 0.50 | 96.37  |
| VML008       | -0.45 | 0.311 | 0.57 | 89.32  |
| VML009       | 0.995 | 0.628 | 0.59 | 120.96 |
| VML010       | -1.22 | -0.78 | 0.56 | 99.82  |
| VML011       | -0.32 | 0.246 | 0.54 | 89.88  |
| VML012       | -1.54 | -0.55 | 0.50 | 104.24 |
| VML015       | -1.16 | -0.84 | 0.65 | 99.51  |

|        |       |       |      |        |
|--------|-------|-------|------|--------|
| VML016 | -1.32 | 0.534 | 0.47 | 115.77 |
| VML017 | -0.9  | -0.78 | 0.63 | 85.70  |
| VML018 | 0.305 | -0.14 | 0.51 | 102.39 |
| VML020 | 0.705 | -0.38 | 0.60 | 88.53  |
| VML021 | -1.02 | -0.77 | 0.50 | 105.51 |
| VML022 | -1.28 | 0.266 | 0.53 | 110.15 |
| VML023 | -0.33 | 0.331 | 0.52 | 101.44 |
| VML024 | -0.81 | 0.381 | 0.51 | 103.10 |
| VML025 | -0.54 | -1.4  | 0.62 | 95.07  |
| VML026 | 0.016 | 0.245 | 0.50 | 104.72 |
| VML027 | -0.18 | 0.545 | 0.56 | 91.64  |
| VML028 | 0.908 | -0.5  | 0.56 | 85.68  |
| VML030 | 1.539 | 1.299 | 0.57 | 109.51 |
| VML031 | 0.122 | 0.29  | 0.49 | 104.48 |
| VML032 | -0.23 | 0.821 | 0.52 | 94.01  |
| VML033 | 0.093 | 0.888 | 0.61 | 94.76  |
| VML034 | -0.41 | 0.218 | 0.55 | 92.12  |
| VML036 | 1.682 | 1.457 | 0.47 | 101.55 |
| VML039 | -0.89 | -0.22 | 0.56 | 95.62  |
| VML040 | -0.28 | 0.552 | 0.50 | 85.31  |
| VML041 | 1.209 | 0.901 | 0.53 | 112.23 |
| VML042 | 0.699 | 0.695 | 0.61 | 85.07  |
| VML043 | -0.85 | -1    | 0.51 | 94.62  |
| VML044 | 0.747 | 0.388 | 0.51 | 92.83  |
| VML046 | 0.646 | 1.024 | 0.60 | 107.18 |
| VML047 | 0.466 | -0.28 | 0.56 | 92.77  |
| VML048 | -0.76 | -0.93 | 0.47 | 107.98 |
| VML049 | -0.05 | -0.21 | 0.52 | 107.57 |
| VML050 | -0.29 | -1    | 0.62 | 80.67  |
| VML051 | -1.4  | -1.41 | 0.57 | 88.50  |
| VML052 | -0.67 | 0.03  | 0.53 | 99.94  |
| VML053 | 0.453 | 0.206 | 0.62 | 106.58 |
| VML054 | -1.34 | -0.32 | 0.54 | 82.71  |
| VML055 | -0.33 | 0.144 | 0.47 | 101.17 |
| VML056 | 0.086 | -0.27 | 0.56 | 93.74  |
| VML057 | 0.453 | -0.02 | 0.61 | 104.92 |
| VML058 | -0.51 | -0.74 | 0.60 | 91.46  |
| VML059 | 0.079 | 0.336 | 0.54 | 112.07 |
| VML061 | -0.02 | -1.6  | 0.66 | 90.73  |
| VML063 | 0.066 | 0.272 | 0.56 | 105.46 |
| VML064 | 0.598 | 0.253 | 0.52 | 97.81  |
| VML065 | 0.575 | -0.42 | 0.52 | 89.52  |
| VML066 | -0.65 | 0.026 | 0.55 | 89.78  |
| VML067 | -1.26 | -1.13 | 0.56 | 91.72  |

|        |       |       |      |        |
|--------|-------|-------|------|--------|
| VML068 | -0.17 | 0.543 | 0.55 | 104.07 |
| VML069 | 1.064 | -0.11 | 0.50 | 103.60 |
| VML070 | 0.279 | 0.244 | 0.51 | 94.80  |
| VML073 | -1.27 | -0.25 | 0.48 | 107.99 |
| VML074 | 1.423 | -0.03 | 0.57 | 89.77  |
| VML075 | 0.671 | -0.22 | 0.57 | 97.78  |
| VML076 | 0.036 | 1.351 | 0.52 | 118.74 |
| VML080 | 0.546 | 0.259 | 0.57 | 87.19  |
| VML081 | 0.108 | -0.69 | 0.61 | 86.50  |
| VML083 | 0.305 | -0.83 | 0.53 | 99.96  |
| VML084 | 0.16  | -0.58 | 0.58 | 86.09  |
| VML085 | -0.65 | -0.05 | 0.53 | 92.60  |
| VML086 | -1.29 | -1.22 | 0.45 | 104.77 |
| VML087 | 0.843 | 0.446 | 0.61 | 106.17 |
| VML088 | 1.55  | -0.1  | 0.63 | 93.11  |
| VML089 | 0.627 | -0.34 | 0.63 | 95.43  |
| VML090 | -1    | -0.75 | 0.57 | 93.97  |
| VML091 | 0.302 | -0    | 0.54 | 109.08 |
| VML092 | -0.06 | 0.272 | 0.53 | 106.32 |
| VML093 | -0.48 | -0.25 | 0.58 | 94.65  |
| VML094 | -1.03 | -1.08 | 0.51 | 96.83  |
| VML095 | -0.51 | -0.7  | 0.54 | 88.92  |
| VML096 | -0.53 | -0.41 | 0.53 | 108.54 |
| VML097 | -0.11 | -0.04 | 0.57 | 95.33  |
| VML099 | 1.124 | 0.208 | 0.59 | 99.43  |
| VML100 | -0.54 | 0.134 | 0.57 | 97.39  |
| VML102 | -0.86 | -0.01 | 0.55 | 93.72  |
| VML104 | -1.15 | -0.78 | 0.55 | 106.87 |
| VML106 | -0.79 | 0.665 | 0.53 | 110.81 |
| VML107 | -0.9  | 0.014 | 0.50 | 105.74 |
| VML110 | -1.29 | -0.52 | 0.54 | 104.92 |
| VML111 | -0.81 | -0.81 | 0.53 | 103.53 |
| VML112 | 0.443 | 0.459 | 0.58 | 104.21 |
| VML113 | 0.659 | 0.781 | 0.56 | 97.07  |
| VML114 | 0.53  | 0.901 | 0.62 | 79.68  |
| VML116 | -0.67 | -1.08 | 0.55 | 101.21 |
| VML117 | -1.23 | -0.3  | 0.50 | 96.02  |
| VML118 | -0.03 | 1.294 | 0.59 | 103.42 |
| VML119 | 1.596 | 0.995 | 0.53 | 109.66 |
| VML120 | 0.595 | -0.55 | 0.57 | 94.08  |
| VML121 | 1.634 | 1.355 | 0.56 | 103.86 |
| VML122 | -0.24 | -0.56 | 0.50 | 87.57  |
| VML123 | -0.13 | 0.668 | 0.53 | 110.83 |
| VML124 | -0.07 | -0.78 | 0.49 | 118.67 |

|        |       |       |      |        |
|--------|-------|-------|------|--------|
| VML125 | -0.97 | -1.23 | 0.57 | 108.66 |
| VML126 | -0.07 | 0.357 | 0.53 | 114.95 |
| VML127 | -0.99 | -0.97 | 0.55 | 83.49  |
| VML128 | 0.235 | 0.289 | 0.48 | 112.24 |
| VML129 | -1.02 | -1.17 | 0.52 | 99.72  |
| VML130 | 1.402 | 0.427 | 0.51 | 89.21  |
| VML131 | 0.273 | 0.326 | 0.58 | 95.01  |
| VML132 | -1.29 | -1.06 | 0.51 | 87.27  |
| VML133 | 1.505 | 0.57  | 0.60 | 109.97 |
| VML134 | -1.4  | 0.382 | 0.50 | 99.97  |
| VML136 | 0.439 | 0.263 | 0.67 | 104.17 |
| VML137 | 1.737 | 0.936 | 0.48 | 97.39  |
| VML138 | -1.14 | -0.54 | 0.49 | 92.90  |
| VML139 | -0.13 | 0.237 | 0.55 | 109.41 |
| VML140 | -0.63 | 0.396 | 0.58 | 85.09  |
| VML141 | -0.86 | -0.18 | 0.47 | 92.23  |
| VML143 | -0.05 | 0.435 | 0.55 | 99.64  |
| VML144 | -1.31 | 1.153 | 0.52 | 104.47 |
| VML145 | 0.831 | -0.02 | 0.56 | 118.35 |
| VML146 | 0.578 | 0.296 | 0.53 | 95.88  |
| VML147 | -0.39 | -0.09 | 0.52 | 90.19  |
| VML148 | 0.696 | 0.343 | 0.54 | 109.93 |
| VML150 | 0.07  | 0.265 | 0.53 | 101.03 |
| VML151 | -0.13 | 0.669 | 0.53 | 91.38  |
| VML152 | 2.076 | -0.3  | 0.48 | 93.94  |
| VML153 | 2.37  | 0.595 | 0.49 | 104.87 |
| VML154 | -1.32 | 0.225 | 0.51 | 96.30  |
| VML155 | -0.3  | 0.866 | 0.50 | 113.12 |
| VML156 | 0.483 | -0.65 | 0.54 | 92.17  |
| VML157 | 0.646 | 0.425 | 0.55 | 96.60  |
| VML158 | 2.696 | -0.44 | 0.53 | 92.26  |
| VML159 | 0.18  | 0.348 | 0.53 | 108.09 |
| VML160 | 0.082 | 0.186 | 0.58 | 87.01  |
| VML161 | 0.135 | -0.2  | 0.61 | 107.62 |
| VML162 | -0.83 | -1.28 | 0.58 | 93.13  |
| VML164 | 0.011 | -0.15 | 0.58 | 94.64  |
| VML165 | 1.223 | 0.95  | 0.59 | 115.34 |
| VML168 | 0.02  | -0.17 | 0.57 | 98.13  |
| VML170 | -0.41 | -0.72 | 0.53 | 90.10  |
| VML171 | 0.629 | -0.27 | 0.57 | 89.64  |
| VML173 | -1.17 | -0.24 | 0.56 | 93.27  |
| VML174 | 1.345 | 0.882 | 0.55 | 101.72 |
| VML175 | -1.45 | -1.05 | 0.48 | 91.26  |
| VML176 | 0.047 | 0.289 | 0.56 | 91.36  |

|        |       |       |      |        |
|--------|-------|-------|------|--------|
| VML178 | -1.39 | -0.03 | 0.54 | 112.36 |
| VML179 | 1.051 | 0.801 | 0.53 | 114.05 |
| VML180 | 0.117 | -0.59 | 0.60 | 107.62 |
| VML183 | 0.817 | 0.349 | 0.53 | 102.24 |
| VML184 | 1.045 | -0.33 | 0.65 | 92.84  |
| VML188 | -0.94 | -0.16 | 0.55 | 93.86  |

SD: stalk diameter (mm); PH: plant height (cm); SDW: shoot dry weight (mg); RDW: root dry weight (mg); RSR: root dry weight to shoot dry weight ratio; TDW: total dry weight (mg); DG: daily growth (cm); LRL: lateral root length (cm); TRL: total root length (cm); RSA: root surface area (cm<sup>2</sup>); RV: root volume (cm<sup>3</sup>); RAD: root average diameter (mm) and RTD: root tissue density (mg cm<sup>-3</sup>).