**Table S4** Joint QTL results of 25 NAM RIL subpopulations.

| **Order** | **Marker** | **Chr** | **Genetic1**  **(cM)** | **Physical2 (Mb)** | **LOD** | **Confidence Interval** | | **h23 (100%)** | **Effect4** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cM** | **Mb** |
| 1 | PHM4531.46 | 1 | 41.7 | 22.9 | 9.2 | 39.4 - 45.6 | 22.3 - 28.4 | 0.71 | -0.32 |
| 2 | PZA00455.14/16 | 1 | 96.5 | 180 | 5.1 | 92.2 - 102.2 | 161 - 195.6 | 0.38 | -0.22 |
| 3 | PZA00243.25 | 1 | 199.4 | 296.9 | 9.4 | 198.1 - 202.2 | 295.8 - 298.7 | 0.69 | 0.29 |
| 4 | PZA02279.1 | 2 | 74.6 | 60.4 | 30.1 | 72.7 - 75.9 | 48.7 - 93.1 | 2.6 | 0.57 |
| 5 | PZA01352.5 | 2 | 141.3 | 229.5 | 5.6 | 137.7 - 145.9 | 224 - 234.2 | 0.38 | -0.23 |
| 6 | PZA02678.1 | 3 | 20.1 | 5.4 | 3.6 | 12.6 - 29.7 | 1.3 - 8.3 | 0.32 | 0.21 |
| 7 | PZB02002.1 | 3 | 63.4 | 137.2 | 10.2 | 61.2 - 68.7 | 128.9 - 156.8 | 0.87 | 0.33 |
| 8 | PHM2885.31 | 3 | 77.4 | 167.5 | 12.8 | 72.9 - 79.1 | 158.9 - 171.4 | 1.16 | 0.38 |
| 9 | PZA02212.1 | 3 | 85.6 | 176.3 | 13.1 | 83 - 88.9 | 173 - 180 | 1.24 | 0.4 |
| 10 | PZA03255.1 | 3 | 101.4 | 195.3 | 12.8 | 100.1 - 103.9 | 187.9 - 199.6 | 0.98 | 0.35 |
| 11 | PZA02733.1 | 3 | 112.2 | 205.1 | 12.2 | 105.7 - 122.3 | 199.6 - 214.3 | 1.04 | 0.36 |
| 12 | PZA02668.2 | 3 | 134.6 | 219.7 | 12.5 | 129.8 - 135.6 | 216.4 - 221.4 | 1 | 0.35 |
| 13 | PZA02509.15 | 4 | 0 | 1.3 | 6.3 | 0 - 6.1 | 1.3 - 3 | 0.61 | 0.27 |
| 14 | PZA00683.4 | 4 | 23 | 6.6 | 8.2 | 12.4 - 28.5 | 3 - 11.4 | 0.97 | 0.36 |
| 15 | PZA03270.2 | 4 | 56.3 | 68.8 | 12.1 | 53.5 - 57.7 | 35.9 - 96.8 | 1.9 | 0.49 |
| 16 | PZA01566.1 | 4 | 107.9 | 199.1 | 55.9 | 107.2 - 108.1 | 196.5 - 200.5 | 10.22 | 1.13 |
| 17 | PZA00694.6 | 4 | 117.1 | 230.2 | 96.1 | 116.3 - 117.9 | 229.2 - 231.7 | 8.1 | 1.01 |
| 18 | PZA00529.4 | 4 | 126.5 | 235.2 | 17 | 122.8 - 127.7 | 233.6 - 236.4 | 7.18 | 0.95 |
| 19 | PZA00985.1 | 5 | 42.7 | 14.1 | 8.8 | 41.4 - 51.3 | 12 - 21.9 | 1.91 | 0.49 |
| 20 | PHM12992.5 | 5 | 60.4 | 39.2 | 28.6 | 58.7 - 61.6 | 38.5 - 58.2 | 2.13 | 0.53 |
| 21 | PZA02818.6 | 5 | 67.5 | 78.4 | 28.8 | 65.4 - 72 | 69.1 - 145.9 | 2.28 | 0.53 |
| 22 | PZA00571.1 | 6 | 44.6 | 120.6 | 8.2 | 42.2 - 48.7 | 114.7 - 131.2 | 0.78 | -0.32 |
| 23 | PZA03624.1 | 7 | 45.7 | 20.2 | 8.4 | 42.9 - 48 | 6.5 - 34.2 | 0.59 | -0.28 |
| 24 | PZA00904.1 | 8 | 105.7 | 167.1 | 18.9 | 103.7 - 112 | 166.1 - 170.8 | 1.75 | -0.48 |
| 25 | PHM3925.79 | 9 | 3 | 4 | 11.2 | 0 - 6.8 | 4 - 9 | 0.83 | 0.31 |
| 26 | PZA02325.4 | 9 | 57.7 | 122.2 | 4.9 | 54.9 - 62.7 | 113.4 - 130.9 | 0.25 | 0.18 |
| 27 | PZA01096.1 | 9 | 70.4 | 137.8 | 6.2 | 66.6 - 74 | 134.6 - 141 | 0.4 | 0.23 |
| 28 | PHM15868.56 | 10 | 64.5 | 137.5 | 12.9 | 58.6 - 73.4 | 132.6 - 142.2 | 1.34 | 0.42 |

1 Genetic positions according to IBM31 and NAM32 genetic map.

2 Physical positions according to B73 RefGen\_v2.

3 Phenotypic variations explained by the markers.

4 QTL effects were calculated by using B73 subtracting non-B73 alleles.