Table S2. Significant GWAS results for root related traits.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Peak marker | Chr | Pos (cM) | Trait | -log10 (*P*) | PVE |
| RAC875\_c14926\_589 | 1A | 52.59 | RDW | 3.1 | 0.07 |
| RAC875\_c8482\_160 | 1A | 95.2 | RDW | 5.3 | 0.14 |
| RAC875\_c39401\_502 | 1A | 104.14 | RDW | 5.7 | 0.15 |
| Ku\_c6201\_2890 | 1B | 70.64 | RDW | 3.3 | 0.08 |
| RAC875\_c7674\_634 | 1B | 76.89 | RDW | 3.1 | 0.07 |
| BS00063092\_51 | 1B | 81.61 | RDW | 3.6 | 0.09 |
| RAC875\_c45678\_1083 | 1B | 83.61 | RDW | 3.9 | 0.09 |
| BS00023071\_51 | 1B | 95.49 | RDW | 5.8 | 0.15 |
| Tdurum\_contig8580\_586 | 1B | 120.35 | RDW | 3.3 | 0.08 |
| wsnp\_Ex\_rep\_c80588\_75758453 | 2A | 48.44 | RDW | 3.5 | 0.08 |
| wsnp\_Ex\_rep\_c66809\_65185215 | 2A | 104.1 | RDW | 3.9 | 0.10 |
| Excalibur\_c5438\_274 | 2B | 142.76 | RDW | 3.3 | 0.08 |
| BS00093757\_51 | 2D | 18.53 | RDW | 3.1 | 0.07 |
| BobWhite\_c43213\_184 | 3A | 85.39 | RDW | 3.5 | 0.08 |
| wsnp\_Ex\_rep\_c101942\_87217430 | 3A | 86.16 | RDW | 4.0 | 0.10 |
| wsnp\_Ex\_c11246\_18191331 | 3B | 61.91 | RDW | 3.3 | 0.08 |
| BS00064896\_51 | 3B | 105.94 | RDW | 3.5 | 0.08 |
| BS00072025\_51 | 4A | 66.28 | RDW | 3.8 | 0.09 |
| Excalibur\_c39876\_403 | 4B | 95.24 | RDW | 4.0 | 0.10 |
| IAAV2363 | 5A | 56.48 | RDW | 3.7 | 0.09 |
| Ra\_c700\_1024 | 5A | 62.72 | RDW | 3.2 | 0.07 |
| wsnp\_Ex\_c3834\_6971712 | 5B | 76.94 | RDW | 4.4 | 0.11 |
| RAC875\_c985\_387 | 5B | 95.93 | RDW | 4.1 | 0.10 |
| BS00029720\_51 | 5B | 176.18 | RDW | 3.3 | 0.08 |
| BS00097030\_51 | 5B | 183.93 | RDW | 3.5 | 0.08 |
| CAP12\_c2800\_262 | 6A | 43.53 | RDW | 3.0 | 0.07 |
| Kukri\_c14877\_303 | 6A | 79.08 | RDW | 5.5 | 0.14 |
| BS00040166\_51 | 6A | 93.13 | RDW | 3.6 | 0.09 |
| RAC875\_c6429\_55 | 6A | 141.08 | RDW | 3.1 | 0.07 |
| wsnp\_Ex\_c4728\_8444212 | 6B | 25.82 | RDW | 3.1 | 0.07 |
| CAP12\_c1784\_424 | 6B | 52.94 | RDW | 3.7 | 0.09 |
| wsnp\_Ex\_c45081\_50974769 | 6B | 57.98 | RDW | 3.0 | 0.07 |
| RAC875\_c114809\_130 | 7A | 131.56 | RDW | 3.5 | 0.08 |
| GENE-4616\_496 | 7A | 134.18 | RDW | 3.4 | 0.08 |
| Kukri\_c9728\_1171 | 7A | 217 | RDW | 3.3 | 0.08 |
| wsnp\_JD\_c9040\_9947841 | 7B | 68.84 | RDW | 3.6 | 0.09 |
| BS00055761\_51 | 7B | 70.14 | RDW | 3.2 | 0.08 |
| CAP7\_c2649\_283 | 7B | 140.9 | RDW | 3.4 | 0.08 |
| BS00108793\_51 | 7D | 26.33 | RDW | 3.1 | 0.07 |
| BS+A41:A7200087437\_51 | 1A | 70.1 | SW | 3.3 | 0.07 |
| CAP7\_c1891\_230 | 1A | 95.2 | SW | 4.1 | 0.09 |
| CAP7\_c3847\_204 | 1B | 43.86 | SW | 3.1 | 0.07 |
| Tdurum\_contig9874\_547 | 1B | 62.58 | SW | 3.4 | 0.08 |
| Ku\_c6201\_2890 | 1B | 70.64 | SW | 3.4 | 0.08 |
| Ra\_c18630\_284 | 1B | 111.39 | SW | 3.2 | 0.07 |
| RAC875\_rep\_c88665\_52 | 2A | 47.22 | SW | 3.0 | 0.07 |
| Ra\_c71628\_188 | 2A | 104.13 | SW | 4.2 | 0.10 |
| GENE-0762\_631 | 2A | 177.44 | SW | 3.8 | 0.08 |
| RAC875\_c5577\_1682 | 2B | 20.21 | SW | 3.5 | 0.08 |
| wsnp\_Ku\_c11665\_18999583 | 2B | 91.1 | SW | 4.1 | 0.09 |
| Excalibur\_c6922\_1393 | 2B | 109.53 | SW | 3.7 | 0.08 |
| RAC875\_c37540\_583 | 2B | 139.48 | SW | 5.7 | 0.14 |
| RAC875\_c19685\_944 | 2B | 144.98 | SW | 3.4 | 0.08 |
| RAC875\_c25656\_289 | 2D | 8.52 | SW | 3.5 | 0.08 |
| Excalibur\_c24307\_739 | 2D | 61.68 | SW | 3.2 | 0.07 |
| Ku\_c17560\_146 | 3A | 26.01 | SW | 3.4 | 0.07 |
| RAC875\_c17907\_181 | 3A | 90.55 | SW | 3.7 | 0.08 |
| Kukri\_c32046\_493 | 3B | 62.67 | SW | 3.8 | 0.08 |
| IACX8272 | 3B | 69.53 | SW | 3.6 | 0.08 |
| BobWhite\_c32864\_250 | 3B | 74.26 | SW | 3.2 | 0.07 |
| BS00022512\_51 | 3B | 80.13 | SW | 3.8 | 0.09 |
| RAC875\_c23665\_68 | 3B | 134.83 | SW | 3.1 | 0.07 |
| CAP12\_c2972\_140 | 4A | 118.72 | SW | 3.7 | 0.08 |
| Excalibur\_c19666\_203 | 4A | 121.67 | SW | 4.3 | 0.10 |
| RAC875\_rep\_c100803\_217 | 4A | 144.38 | SW | 3.1 | 0.07 |
| RAC875\_c24098\_141 | 4B | 29.88 | SW | 3.1 | 0.07 |
| BS00062691\_51 | 4B | 61.84 | SW | 3.7 | 0.08 |
| Ku\_c101046\_1063 | 4B | 77.72 | SW | 4.7 | 0.11 |
| Tdurum\_contig50861\_106 | 4B | 86.55 | SW | 3.6 | 0.08 |
| BS00094770\_51 | 4D | 80.43 | SW | 5.0 | 0.12 |
| wsnp\_Ex\_c15046\_23216392 | 5A | 39.62 | SW | 3.3 | 0.07 |
| IAAV3512 | 5A | 49.03 | SW | 3.1 | 0.07 |
| Excalibur\_c97639\_173 | 5A | 53.47 | SW | 4.4 | 0.10 |
| Kukri\_rep\_c104877\_2166 | 5A | 59.11 | SW | 3.6 | 0.08 |
| Kukri\_c10033\_724 | 5A | 89.96 | SW | 4.7 | 0.11 |
| wsnp\_JD\_c10416\_11077664 | 5B | 40.46 | SW | 3.5 | 0.08 |
| GENE-2794\_534 | 5B | 109.53 | SW | 3.4 | 0.07 |
| RAC875\_c7804\_236 | 6A | 79.08 | SW | 3.4 | 0.08 |
| Excalibur\_c52196\_235 | 6A | 119.6 | SW | 3.4 | 0.07 |
| BobWhite\_c35035\_317 | 6A | 135.76 | SW | 4.1 | 0.10 |
| TA005098-0959 | 6A | 140.87 | SW | 3.8 | 0.09 |
| Excalibur\_rep\_c106283\_82 | 6D | 118.53 | SW | 3.1 | 0.07 |
| wsnp\_Ku\_c4299\_7814936 | 7A | 42.08 | SW | 3.4 | 0.08 |
| Kukri\_c8718\_193 | 7A | 135.81 | SW | 3.3 | 0.07 |
| RAC875\_c56692\_170 | 7A | 149.91 | SW | 3.3 | 0.07 |
| wsnp\_Ex\_c7071\_12171619 | 7A | 164.29 | SW | 3.0 | 0.06 |
| Excalibur\_c6738\_2072 | 7B | 83.07 | SW | 4.2 | 0.10 |
| Excalibur\_c41736\_124 | 7B | 122.65 | SW | 3.6 | 0.08 |
| GENE-4796\_65 | 7D | 162.52 | SW | 5.0 | 0.12 |
| Excalibur\_c8613\_1266 | 1B | 78.12 | TRN | 4.0 | 0.09 |
| wsnp\_JD\_c8158\_9193784 | 3B | 62.57 | TRN | 3.7 | 0.09 |
| RFL\_Contig4336\_184 | 4A | 91.23 | TRN | 3.1 | 0.06 |
| BobWhite\_c20051\_53 | 4B | 66.32 | TRN | 3.5 | 0.08 |
| RFL\_Contig5137\_602 | 5A | 50.59 | TRN | 3.0 | 0.06 |
| wsnp\_JD\_c23511\_20069005 | 5A | 84.58 | TRN | 3.6 | 0.08 |
| Tdurum\_contig12995\_792 | 5B | 98.28 | TRN | 4.9 | 0.12 |
| CAP11\_c3827\_198 | 6A | 74.24 | TRN | 3.6 | 0.08 |
| RAC875\_c66376\_395 | 6B | 36.69 | TRN | 3.2 | 0.07 |
| Excalibur\_c31379\_71 | 6B | 76.2 | TRN | 3.0 | 0.06 |
| wsnp\_Ex\_c31955\_40681185 | 7A | 216.28 | TRN | 3.8 | 0.09 |
| BS00093078\_51 | 1B | 8.36 | SRA | 3.3 | 0.07 |
| Tdurum\_contig67656\_387 | 1B | 100.28 | SRA | 3.7 | 0.08 |
| Tdurum\_contig50720\_482 | 2A | 151.3 | SRA | 3.1 | 0.08 |
| RAC875\_rep\_c83950\_222 | 2B | 144.16 | SRA | 3.4 | 0.08 |
| RAC875\_rep\_c90531\_283 | 3A | 130.17 | SRA | 3.1 | 0.07 |
| wsnp\_Ex\_c3040\_5615597 | 3B | 80.99 | SRA | 3.0 | 0.07 |
| BS00057988\_51 | 3B | 99.37 | SRA | 3.6 | 0.08 |
| wsnp\_Ex\_c41074\_47987860 | 4A | 80.05 | SRA | 3.1 | 0.07 |
| Kukri\_c34453\_332 | 4B | 70.91 | SRA | 4.4 | 0.11 |
| RAC875\_c26353\_719 | 5A | 91.7 | SRA | 3.2 | 0.07 |
| wsnp\_Ex\_c2459\_4591695 | 5B | 11.23 | SRA | 3.3 | 0.08 |
| BS00028183\_51 | 5B | 51.04 | SRA | 4.4 | 0.11 |
| BobWhite\_c2730\_245 | 5D | 157.37 | SRA | 3.0 | 0.07 |
| RFL\_Contig5170\_330 | 6A | 16.58 | SRA | 3.2 | 0.07 |
| RFL\_Contig5314\_1147 | 6A | 103.5 | SRA | 3.5 | 0.08 |
| IAAV6131 | 7A | 58.82 | SRA | 3.0 | 0.07 |
| wsnp\_Ex\_c31955\_40681185 | 7A | 216.28 | SRA | 3.9 | 0.09 |
| Tdurum\_contig8158\_269 | 1B | 82.43 | SL | 4.2 | 0.09 |
| GENE-3975\_114 | 2A | 115.14 | SL | 3.1 | 0.06 |
| RFL\_Contig5277\_888 | 2A | 177.65 | SL | 4.1 | 0.09 |
| BS00083497\_51 | 2B | 109.53 | SL | 3.1 | 0.06 |
| wsnp\_Ex\_rep\_c102478\_87635370 | 3A | 82.42 | SL | 3.0 | 0.06 |
| Tdurum\_contig49753\_191 | 3B | 35.72 | SL | 3.1 | 0.06 |
| BobWhite\_c47144\_153 | 4B | 109.51 | SL | 3.1 | 0.06 |
| RAC875\_c35993\_308 | 5A | 56.48 | SL | 3.5 | 0.07 |
| Excalibur\_c45297\_316 | 5A | 86.59 | SL | 3.0 | 0.06 |
| BobWhite\_c6966\_236 | 5A | 130.9 | SL | 4.2 | 0.09 |
| BS00023161\_51 | 5B | 48.29 | SL | 4.1 | 0.08 |
| wsnp\_Ex\_c20440\_29511162 | 5B | 57.83 | SL | 3.5 | 0.07 |
| Tdurum\_contig44635\_759 | 5B | 95.52 | SL | 3.7 | 0.08 |
| BobWhite\_c15802\_72 | 6A | 27.15 | SL | 3.7 | 0.08 |
| RAC875\_rep\_c106439\_1159 | 6A | 48.09 | SL | 4.0 | 0.09 |
| RFL\_Contig854\_2253 | 7A | 81.91 | SL | 3.2 | 0.06 |
| IAAV6137 | 7B | 136.17 | SL | 4.0 | 0.08 |
| RAC875\_c34012\_983 | 7B | 163.16 | SL | 3.8 | 0.08 |