**Table S4:**

**Epistatic-effect QTLs for seed vigor traits detected in wheat IL-2 population.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Trait | Aging time | QTL1 | MarkerName1 | QTL2 | MarkerName2 | LOD | PVE(%) | AA |
| GR | 72 h | *qGR-72h-1B* | *Xwmc406* | *qGR-72h-1D* | *Xbarc62* | 6.3 | 3 | -0.2 |
|  | 72 h | *qGR-72h-1B* | *Xwmc406* | *qGR-72h-5A* | *Xgwm205* | 6.57 | 2.04 | -0.13 |
|  | 72 h | *qGR-72h-1B* | *Xwmc406* | *qGR-72h-7A* | *Xwmc809* | 5.73 | 2.21 | -0.15 |
| GI | 0 h | *qGI-0h-1D* | *Xgdm126* | *qGI-0h-7B* | *Xgwm400* | 6.62 | 4.8 | 0.48 |
| SL | 48 h | *qSL-48h-2A-1* | *Xwmc667* | *qSL-48h-2D-3* | *Xwmc18* | 5.37 | 0.81 | -0.69 |
|  | 48 h | *qSL-48h-2A-2* | *Xgwm359* | *qSL-48h-3B* | *Xgwm181* | 5.16 | 2.94 | 0.82 |
|  | 48 h | *qSL-48h-2D-1* | *Xgwm261* | *qSL-48h-3D* | *Xcfd9* | 6.54 | 3.54 | 0.61 |
|  | 48 h | *qSL-48h-2D-2* | *Xwmc112* | *qSL-48h-3D* | *Xcfd9* | 5.76 | 3.1 | 0.57 |
|  | 60 h | *qSL-60h-2A* | *Xwmc667* | *qSL-60h-5A* | *Xcfa2155* | 4.93 | 5.76 | -0.9 |
| RL | 24 h | *qRL-24h-1D* | *Xgdm126* | *qRL-24h-3D* | *Xcfd9* | 5.1 | 2.28 | -0.58 |
|  | 24 h | *qRL-24h-1D* | *Xgdm126* | *qRL-24h-5B* | *Xgwm604* | 5.44 | 2.42 | -0.92 |
|  | 36 h | *qRL-36h-1D* | *Xgdm126* | *qRL-36h-5B* | *Xgwm604* | 4.98 | 6.18 | -0.96 |
| SFW | 48 h | *qSFW-48h-2A* | *Xwmc667* | *qSFW-48h-2A-2* | *Xgwm636* | 5.02 | 1.56 | -3.56 |
|  | 48 h | *qSFW-48h-2A* | *Xwmc667* | *qSFW-48h-2A-3* | *Xwmc407* | 5.06 | 1.6 | -3.49 |
|  | 48 h | *qSFW-48h-2D-1* | *Xwmc503* | *qSFW-48h-3D* | *Xcfd9* | 5.43 | 1.81 | 3.46 |
|  | 48 h | *qSFW-48h-2D-2* | *Xgwm261* | *qSFW-48h-3D* | *Xcfd9* | 6.53 | 2.7 | 4.01 |
|  | 48 h | *qSFW-48h-2D-3* | *Xwmc112* | *qSFW-48h-3D* | *Xcfd9* | 5.53 | 2.07 | 3.47 |

**Note:** Positive value means parent type effect ＞ recombinant type effect while negative value means recombinant type effect ＞ parent type effect.