

## Tables and Figures Legend

**Figure S1:** AS-PCR amplification of HMW-GS genes from spelt wheat cultivars. 1-2: Spelt 137. 3-4: Spelt 6.

**Figure S2:** Evaluation of the predicted 3D structure of 6 HMW-GSs in wheat. A: Prediction alignment error B: Residual confidence score C: Matching template.

**Figure S3:** Predictive model for the 3D structure of 6 HMW-GSs in wheat. The 3D protein model confidence score rank. 1Ax2.1\*: rank-1 to 5 is listed as 33.9, 31.8, 30.4, 28.6, 29.4; 1Ax1: rank-1 to 5 is listed as 34.9, 31.9, 30.7, 29.9, 28.8; 1Ax2\*: rank-1 to 5 is listed as 34.4, 31.8, 30.4, 20.1, 28.6; 1By19\*: rank-1 to 5 is listed as 36.9, 33.7, 35.3, 32.0, 31.0; 1By16: rank-1 to 5 is listed as 37.4, 33.6, 34.8, 31.6, 30.8; 1By9: rank-1 to 5 is listed as 37.7, 33.8, 35.7, 32.4, 31.1; 1By8: rank-1 to 5 is listed as 37.2, 33.4, 35.0, 32.4, 31.1; 1By18: rank-1 to 5 is listed as 37.0, 32.8, 34.9, 31.9, 31.1.

**Figure S4:** PCR amplification of the promoter sequences of 1Ax2.1\* (A) and 1By19\* (B) from spelt wheat.

**Figure S5:** Molecular marker primers of 1Ax2.1\* gene. The red boxes indicate template of the primer 2.1\*F and 2.1\*R, green boxes indicate TATA-box (TATA), blue boxes indicate MYC(CAATTG), purple boxes indicate A-box (CCGTCC), black boxes indicate ABRE (ACGTG).

**Figure S6:** Molecular marker primers of 1By19\* gene. The red boxes indicate template of the primer 19\*F and 19\*R, green boxes indicate AE-box (AGAAACAA), black boxes indicate MYC(CAATTG), purple boxes indicate G-Box (CACGTT).

**Table S1:** Wheat materials used in the current study and their *Glu-1* compositions.

**Table S2:** The primer sequences used to amplify HMW-GS genes.

**Table S3:** Estimation of divergence time (MYA) among 27 HMW-GS genes.

**Table S4:** The sequences of primers used to amplify the upstream promoter region of HMW-GS genes.

**Table S5:** Molecular marker primers used for amplifying HMW-GS genes.

**Table S6:** The amplification conditions for molecular marker development of 1Ax2.1\* and 1By19\* genes.