

**Figure S1.** Plant height, panicle number per plant, grain number per panicle and seed-sitting rate in YSZ*wx1,* QLD*wx1* and their corresponding WT plants

(a) Plant height of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

(b) panicle number per plant of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

(c) grain number per panicle of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

(d) seed-sitting rate of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

Data are presented as means ±sd. n=50 in a-d; two-tailed, two-sample Student t-test. NS, no significant



**Figure S2.** Grain width, grain length and 1000 grains weight in YSZ*wx1,* QLD*wx1* and their corresponding WT plants

(a) Grain width of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

(b) grain length of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

(c) 1000 grains weight of YSZ*wx1* and QLD*wx1* mutant and corresponding their WT.

Data are presented as means ±sd. n=50 in a-d; two-tailed, two-sample Student t-test. NS, no significant, \*P < 0.05



**Figure S3.** Grain phenotypes, gel consistency, rapid viscosity analyzer profiles and gelatinization properties in SH789*wx,* HZ*wx,* TJG*wx* and their corresponding WT plants

(a) Grain phenotypes of SH789, HZ and TJG *wx* mutant and corresponding their WT.

(b) Gel consistency of SH789, HZ and TJG *wx* mutant and corresponding their WT.

(c) Rapid viscosity analyzer profiles curve of SH789, HZ and TJG *wx* mutant and corresponding their WT.

(d) Gelatinization properties curve of SH789, HZ and TJG *wx* mutant and corresponding their WT.

**Figure S4.** Differences in amylopectin structure between SH789*wx,* HZ*wx,* TJG*wx* and their corresponding WT starch

(a-c) Comparison of percentage distribution of HPAEC–PAD chromatograms and difference in chain-length distribution of amylopectin chain length from SH789*wx,* HZ*wx* and TJG*wx* mutant and corresponding its WT, respectively.

The top row of comparison of percentage distribution = (WT; &minus; *wx* mutant)