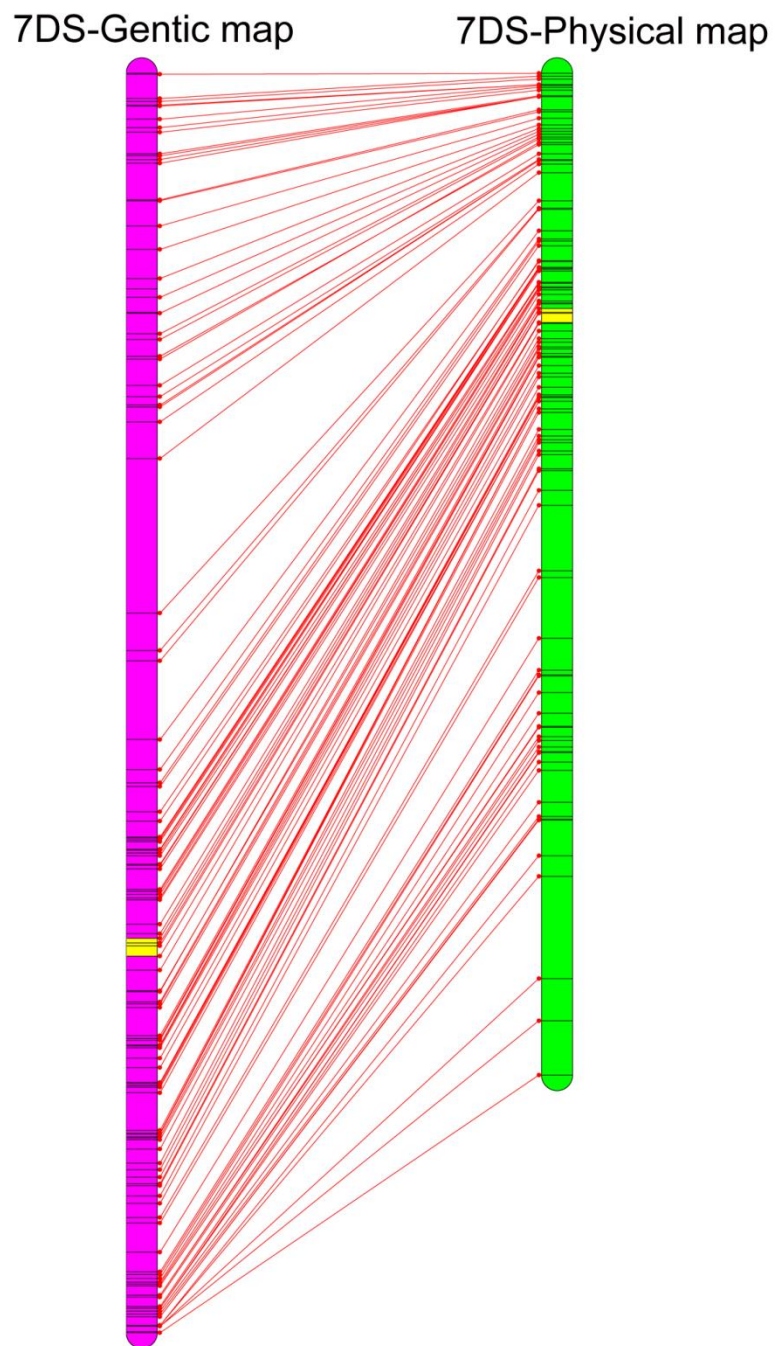
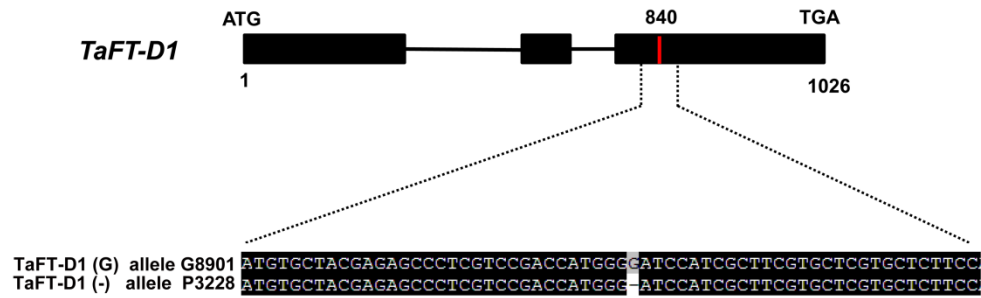




Supplementary Fig. S1 Collinearity between the genetic (left) and physical (right) positions for SNPs mapped on the chromosome 7DS in PG-RIL genetic map

(a)



(b)

TaFT-D1 (-) : MAGRDRDPLVVGRVVGVDVLDPFIRTTNLRVTFGNRTVSNGCELKPSMVAQQPRVEVGGNEMRTFYTLVMV:70

TaFT-D1 (G) : MAGRDRDPLVVGRVVGVDVLDPFIRTTNLRVTFGNRTVSNGCELKPSMVAQQPRVEVGGNEMRTFYTLVMV:70

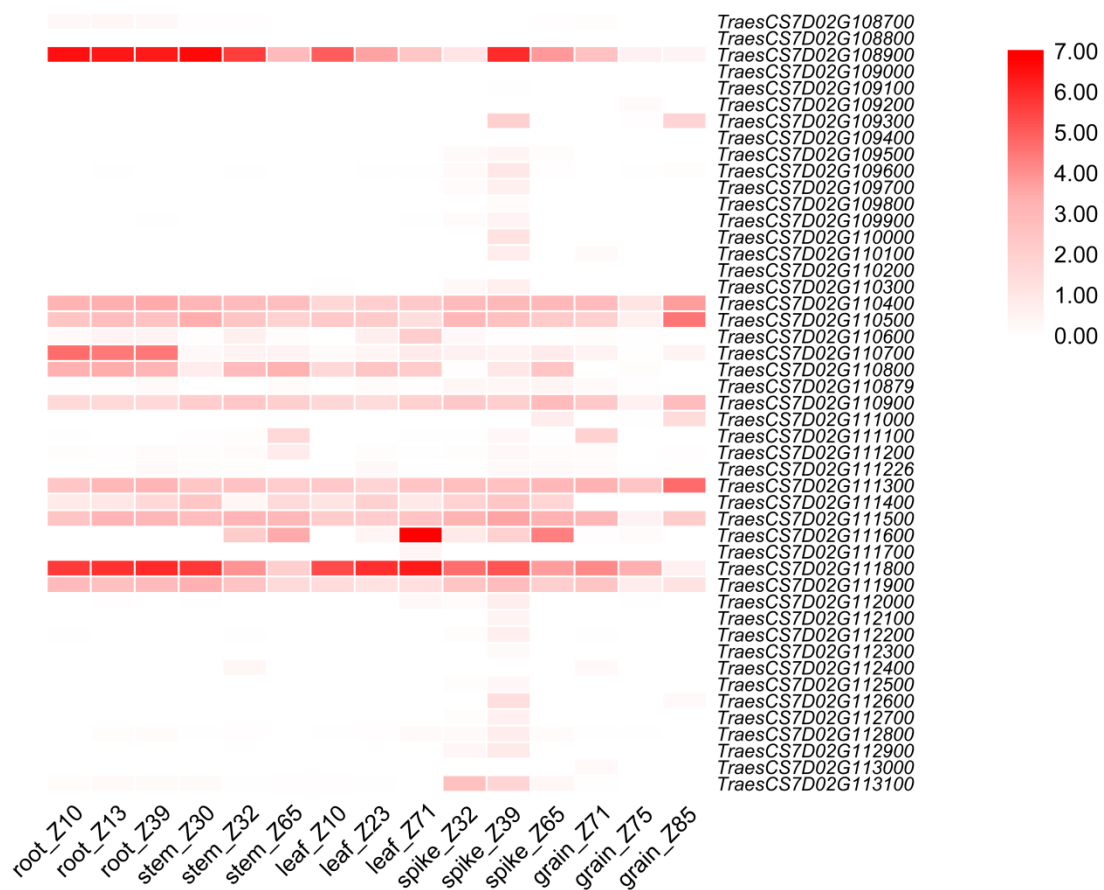
DPDAPSPSDPNLREYLHWLVTDIPGTTGASFGQEVMCYESPRPTMGTHRFVLVLFQQIGRQTVYAPGWR:139

DPDAPSPSDPNLREYLHWLVTDIPGTTGASFGQEVMCYESPRPTMGSIASCSSSSSSAGRPCTLPCCAR:140

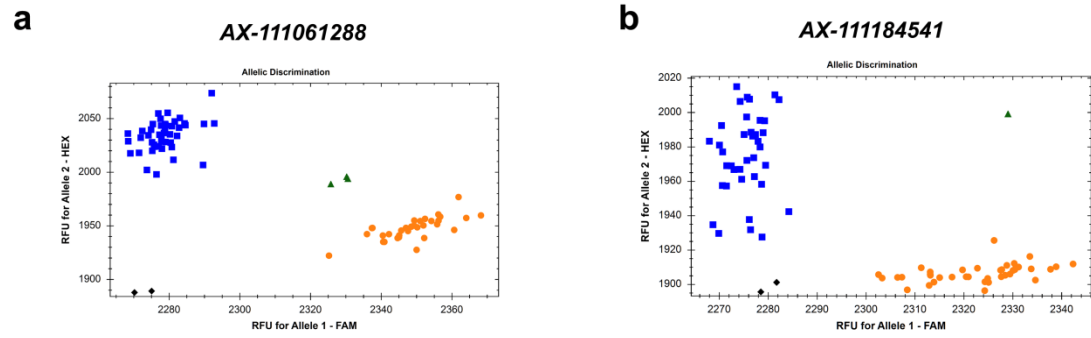
QNEN--TRDFAELYNIGPEVAAVYFNCQREAGSGGRRMYN:177

TSTPGTSSESSTTSARLSPSTST-ASVRPAPAGGCTI--:177

Supplementary Fig. S2 A 1bp InDel in *TaFT-D1* caused a frameshift mutation of the protein. (a) Sequence alignment of *TaFT-D1* showing 1 bp InDel between P3228 and G8901. (b) Protein alignment of TaFT-D1 showing frameshift mutation in P3228.



Supplementary Fig. S3 Heatmap showing the expression profile of DEGs at 15 development stages



Supplementary Fig. S4 Allelic segregation of KASP markers *AX-111061288* (a) and *AX-111184541* (b) for *QTKw.cas-7D.2* and *QKw.cas-7D*.