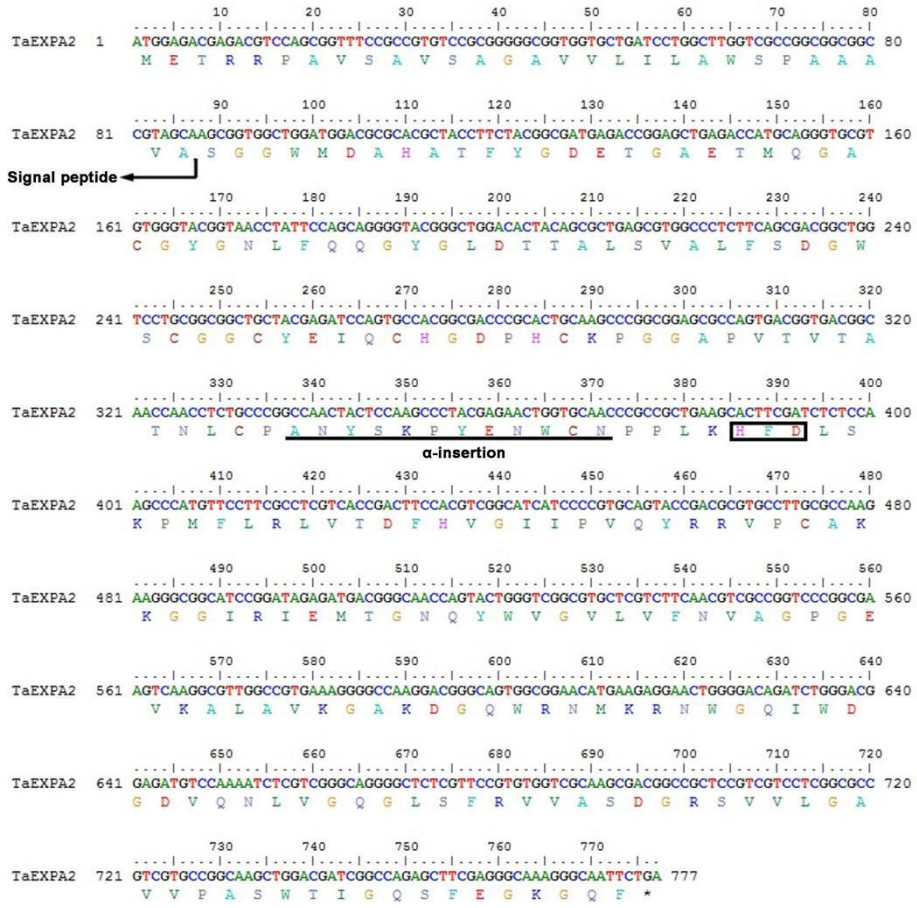

Fig. S1. Sequencing results of the cloned *TaEXPA2* gene.

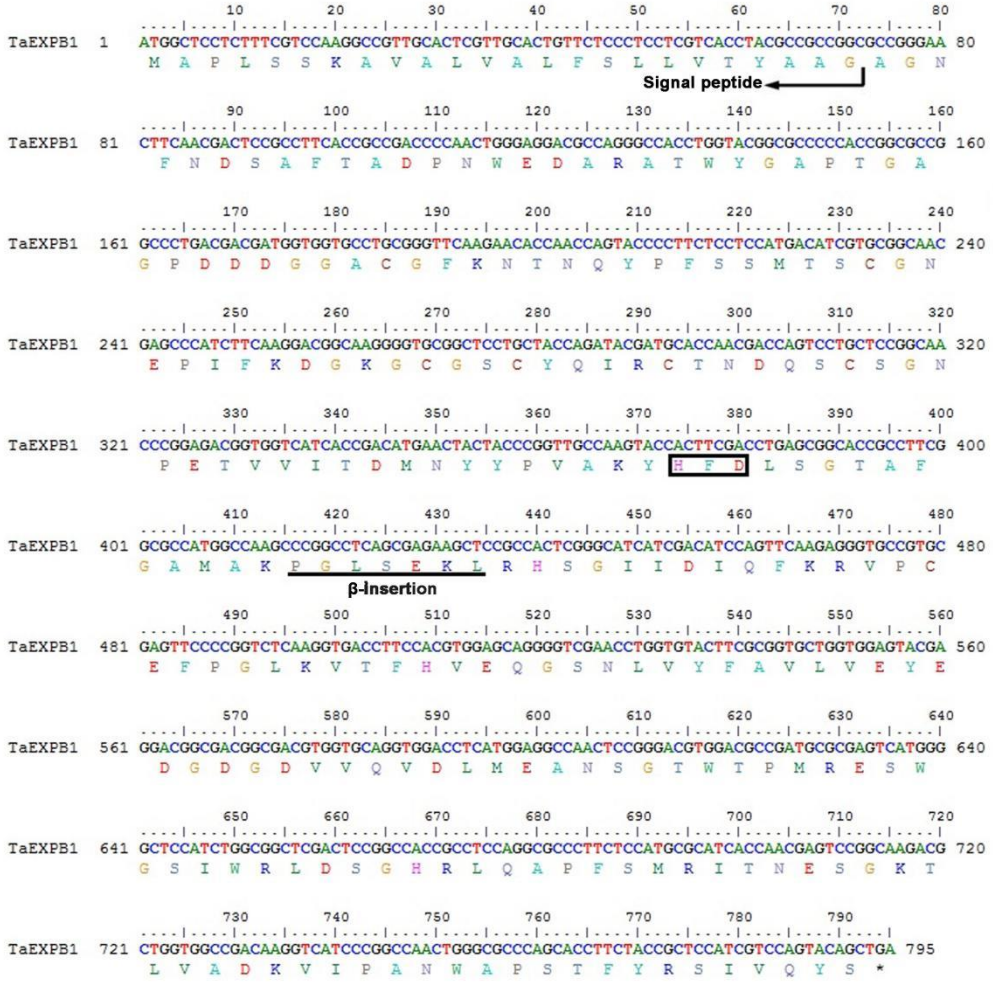

Fig. S2. Sequencing results of the cloned *TaEXPB1* gene.

Table S1. Characteristics of genes encoding expansin proteins in different plant species.

Gene name	Protein name	Uniprot ID	Signal peptide	Expansin-like EG45	Expansin-like CBD
AAS48871	TaEXPA2	Q6QFB1	1–29	51–163	173–254
AT1G69530.1	AtEXPA1	Q9C554	1–21	45–157	167–246
NC_029261	OsEXPA17	Q4PR49	1–21	71–185	195–279
AAK56119	ZmEXPA1	Q94KT7	1–25	49–161	171–250
AAT99292	TaEXPB1	Q6QFA3	1–24	59–165	178–259
AT1G65680.1	AtEXPB2	Q9SHY6	1–29	65–173	186–269
AF332174	ZmEXPB1	P58738	1–24	63–169	183–264
NC_029265	OsEXPB4	Q94LR4	1–24	75–181	194–281

Table S2. Primers used for cloning and transgenic vector construction of expansins in wheat

Primer name	Sequence (5' to 3')*	Annotation
CE-TaEXPA2-F	ggatcttccagagatATGGAGACGAGACGTCC AGCGGTTTCC	Cloning vector constructions for sequencing
CE-TaEXPA2-R	ctgccgttcgacgatCTATCAGAATTGCCCTTTGCC CTCGAAGC	
CE-TaEXPB1-F	ggatcttccagagatATGGCTCCTCTTTCGTC	
CE-TaEXPB1-R	ctgccgttcgacgatTCAGCTGTACTGGACGAT	
1302-TaEXPA2-F	gagagaacacgggggactcttgaccatggtgATGGAGACGA GACGTCCAGC	Transgenic vector constructions: *35S::TaEXPA2::GFP* and *35S::TaEXPB1::GFP*
1302-TaEXPA2-R	ttctcctttactagtcagatctaccatggaGAATTGCCCTTTG CCCTCGAAGC	
1302-TaEXPB1-F	gagagaacacgggggactcttgaccatggtgATGGCTCCTC TTTCGTC	
1302-TaEXPB1-R	ttctcctttactagtcagatctaccatggaGCTGTACTGGACG AT	

*Lowercases represent homologous arms used for homologous recombination of vector construction.

Table S3. Primers used for qRT-PCR of expansin genes in wheat and transgenic Arabidopsis plants

Primers	Sequences ((5' to 3')	Annotation
qTaEXPA2-F	AGCAAGCGGTGGCTGGATG	Real-time RT-PCR for TaEXPA2
qTaEXPA2-R	GCCGTGGCACTGGATCTCGTA	
qTaEXPB1-F	TCTCCCTCCTCGTCACCTAC	Real-time RT-PCR for TaEXPB1
qTaEXPB1-R	CCTTGAAGATGGGCTCGT	
qADP-F	GCTCTCCAACAACATTGCCAAC	Real-time RT-PCR for ADP
qADP-R	GCTTCTGCCTGTCACATACGC	
T-TaEXPA2-F	CATGTCCAAAATCTCGTCG	PCR confirmation of the transgenic plants
T-TaEXPA2-R	AATGGTTGTCTGGTAAAAGG	
T-TaEXPB1-F	GGCGTCCACGTCCCGGAGTTG	
T-TaEXPB1-R	AATGGTTGTCTGGTAAAAGG	