Title

The Wheat GT factor *TaGT2L1D* Negatively Regulates Drought Tolerance and Plant Development

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Supplementary Information

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Supplementary Fig. S6 Expression level of *TaGT2L1D* in the *TaGT2L1DOE* lines

Supplementary Table S1 The sequences of the primers and probes used in this study.

Application	**Name**	**Sequence (5′-3′)**
Full-length CDS	TaGT2L1-FL-F	CCAACCACCTGTTGCACATACAGA
	TaGT2L1-FL-R	GCATGGAACGGTGACTCGGTG
	TaGT2L2-FL-F	GCGACTGAGGAGGTGAGGG
	TaGT2L2-FL-R	CGACGATTTGGGCTTTCTT
	TaGT2L3-FL-F	GTGCACCCAGTGTGTACTA
	TaGT2L3-FL-R	GGTGGATCTACTGGACCAT
Chromosomal locations	TaGT2L1-chrA-F	GCCATCACATCACACCATCGAT
	TaGT2L1-chrA-R	AATTCTTGGCCTTAACACGAGG
	TaGT2L1-chrB-F	TCCAGCGCATCGGTGGTC
	TaGT2L1-chrB-R	GCAGCTGGGATGGGTTGC
	TaGT2L1-chrD-F	AGTTCCAGAGGCCAAACCCG
	TaGT2L1-chrD-R	GGTGACTCGGTGATGGTGGAATGA
qPCR	TaGT2L1A-q-F	GCCATCACATCACACCATCGAT
	TaGT2L1A-q-R	AATTCTTGGCCTTAACACGAGG
	TaGT2L1B-q-F	TCCAGCGCATCGGTGGTC
	TaGT2L1B-q-R	GCAGCTGGGATGGGTTGC
	TaGT2L1D-q-F	AGTTCCAGAGGCCAAACCCG
	TaGT2L1D-q-R	GGTGACTCGGTGATGGTGGAATGA
	TaACTIN-q-F	CCTCTCTGCGCCAATCGT
	TaACTIN-q-R	TCAGCCGAGCGGGAAATTGT
	AtSDD1-q-F	GCCATTGGAACATTCCGAGC
	AtSDD1-q-R	CTGACCACAGCGGGAAATCT
	AtCCS52A1-q-F	CACGCTGCAAGAGAACAAGA
	AtCCS52A1-q-R	ACCACTTGAGTCCGCATACC
	AtACTIN-q-F	GTCTGGATTGGAGGGTC
	AtACTIN-q-R	TGAGAAATGGTCGGAAA
RT-PCR	AtACTIN-RT-F	GTCTGGATTGGAGGGTC
	AtACTIN-RT-R	TGAGAAATGGTCGGAAA
	TaGT2L1D-RT-F	AAGCAACGGGCAGACAAC
	TaGT2L1D-RT-R	CGTCAGTGTAGTCATCGCC
Subcellular location	TaGT2L1D-Xma1-F	TCCCCCCGGGATGCAGCAGCAGCATCAGCAC
	TaGT2L1D-Xma1-R	TCCCCCCGGGCTACTGAACCATGGCGAGGAAG G
BiFC assay	TaGT2L1D-gateway-F	GGGGACAAGTTTGTACAAAAAAGCAGGCTTCA TGCAGCAGCAGCATCAGC
	TaGT2L1D-gateway-R	GGGGACCACTTTGTACAAGAAAGCTGGGTCCT GAACCATGGCGAGGAAG
Transgenic *Arabidopsis*	TaGT2L1D-EcoR1-F	CCGGAATTCATGCAGCAGCAGCATCAGCAC
	TaGT2L1D-Xba1-R	CTAGTCTAGACTACTGAACCATGGCGAGGAAG G

EMSAs	TaGT2L1D-N-EcoR1-F	CCGGAATTCATGCAGCAGCAGCATCAGCAC
	TaGT2L1D-N-Sal1-R	ACGCGTCGACCTAGAAGAAGCGGTAGCTCTTGCC
	TaGT2L1D-C-EcoR1-F	CCGGAATTCGTCGCCACGGAGCAGCACG
	TaGT2L1D-C-Sal1-R	ACGCGTCGACCTACTGAACCATGGCGAGGAAGG
	SDD1-GT3box-F-probe	TTCTTTGGCTTGGTAAAACTTCAATGGA
	SDD1-GT3box-R-probe	TCCATTGAAGTTTTACCAAGCCAAAGAA
Trans-repression assay	TaGT2L1D-pYF503-EcoR1-F	CCGGAATTCATGCAGCAGCAGCATCAGC
	TaGT2L1D-pYF503-Sal1-R	ACGCGTCGACCTACTGAACCATGGCGAGGA
	GAL4-TaGT2L1D-F	GGGGACAAGTTTGTACAAAAAAGCAGGCTATGAAGCTACTGTCTTCTATCG
	GAL4-TaGT2L1D-R	GGGGACCACTTTGTACAAGAAAGCTGGGTCTACTGAACCATGGCGAGGA
	proSDD1-Pst1-F	AAAACTGCAGCGAACGGGAAGCGGAAAG
	proSDD1-BamH1-R	CGCGGATCCTGGAGAGAGTTAAAAAAAGGAGTTG

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TaGT2L1A        ---------ATGCAGCAGCACCAGCACCAGGGTGACGCGTCTCAGTACGGGGCGCCGCCG
TaGT2L1B        ATGCAGCAGCAGCATCAGCACCACCACCAGGGTGGCGGGTCTCAGTACGGGGC---GCCG
TaGT2L1D        ATGCAGCAGCAGCATCAGCACCACCACCAGGGTGGCGGGTCTCAGTACGGGGC---GCCG
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TaGT2L1A        CAGCCGGCGGACATGGGGCCGTTCTCCGCGCAGCAGGCTCCGGCCCCTGTGCCGCTGAGC
TaGT2L1B        CCGCCGGCGGACATGGGGCCGTTCTCCGCGCAGCCGGCTCCGGGCCCGGTGCCGCTGAGC
TaGT2L1D        CCGCCGGCGGACATGGGGCCGTTCTCCGCGCAGCCGGCTCCGGGCCCGGTGCCGCTGAGC
                * ******************************** ******** *** ************

TaGT2L1A        GTCCGGCCACCGCCGACCCAGCACCAGCAGCAGCAGAACCCGCAGCCGAGCTACGACGAA
TaGT2L1B        GTCCGGCCACCGCCGACGCAGCAGCAGCAGCCA------CAGCCGAGCTACGAACAGGAA
TaGT2L1D        GTCCGGCCACCGCCGACGCAGCAGCAGCAGCCA------CAGCCGAGCTACGAACAGGAA
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TaGT2L1A        TTGGCCGGCGCGTCGGGCGCCGGCGCCAGCGGCTTCCCCGACGACGACATGCTGGGCGAC
TaGT2L1B        TTGGCCGCCGCGTCGGGCGCCGGCGGAAGCAGCTTCCCCGACGACGACATGCTGGGCGAC
TaGT2L1D        TTGGCCGCCGCGTCGGGCGCCGGCGGAAGCAGCTTCCCCGACGACGACATGCTGGGCGAC
                ******* *****************  *** ****************************

TaGT2L1A        TCCGGCGGGCACAGCGGCGGCGGGCTGGGGTCGGGCGGCAACCGGTGGCCGCGGGAGGAG
TaGT2L1B        TCCGGCGGCCACAGCGCCGGCGGGCTGGGGTCGGGCGGCAACCGGTGGCCGCGGGAGGAG
TaGT2L1D        TCCGGCGGCCACAGCGCCGGCGGGCTGGGGTCGGGCGGCAACCGGTGGCGGCGGGAGGAG
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TaGT2L1A        ACGCTGGCCCTCATCAGGATCCGGTCGGAGATGGACACCACCTTCCGCGACGCCACCCTC
TaGT2L1B        ACGCTGGCCCTCATCAGGATCCGGTCGGAGATGGACACCACCTTCCGCGACGCCACCCTC
TaGT2L1D        ACGCTGGCCCTCATCAGGATCCGGTCGGAGATGGACACCACCTTCCGCGACGCCACCCTC
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TaGT2L1A        AAGGTCCCCCTCTGGGAGGAGGTCTCCAGGAAGCTTGCGGAGCTGGGCTACAAGAGGAGC
TaGT2L1B        AAGGGCCCCCTCTGGGAGGAGGTCTCCAGGAAGCTTGCGGAGCTGGGCTACAAGAGGAGC
TaGT2L1D        AAGGGCCCCCTCTGGGAGGAGGTCTCCAGGAAGCTTGCGGAGCTGGGCTACAAGAGGAGC
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TaGT2L1A        GCCAAGAAGTGCAAGGAGAAGTTCGAGAACGTGCACAAGTACTACAAGCGCACCAAGGAG
TaGT2L1B        GCCAAGAAGTGCAAGGAGAAGTTCGAGAACGTGCACAAGTACTACAAGCGCACCAAGGAG
TaGT2L1D        GCCAAGAAGTGCAAGGAGAAGTTCGAGAACGTGCACAAGTACTACAAGCGCACCAAGGAG
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TaGT2L1A        GGCCGCGCCGGCCGGCAGGACGGCAAGAGCTACCGCTTCTTCCAGGAGCTCGAGGCACTG
TaGT2L1B        GGCCGGGCCGGCCGGCAGGACGGCAAGAGCTACCGCTTCTTCCAGGAGCTCGAGGCGCTG
TaGT2L1D        GGCCGGGCCGGCAGGCAGGACGGCAAGAGCTACCGCTTCTTCCAGGAACTCGAGGCGCTG
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TaGT2L1A        CACGCCGCCACCGCCGCCGCGCAGCACCACCAGCAGCACCAGGAGCAGTTGCCTCTCGTC
TaGT2L1B        CACGCCGCCACCGCAGCCGCGCAGCACCAG------CAGCAGGAGCACTTGCCGCTGGTC
TaGT2L1D        CACGCCGCCACCGCCGCCGCGCAGCAGCAG------CAGCAGGACCACTTGCCGCTGGTC
                ********************* ********** **       ** ***** ** ***** ** ***

TaGT2L1A        GTCAGTGCCGCCCCCCCGCCGCAGATGCACGCCTTCTCCGCGCCGCAGCCGATGAGCGCA
TaGT2L1B        GTCAGTGCAGCCCCCCCGCCGCAGATGCACGCCTTCTCGGCGCCCCAGCCGATGAGCGCA
TaGT2L1D        GTCAGTGCCGCCCCCCCGCCGCAGATGCACGCCTTCTCCGCGCCGCAGCCGATGAGCGCA
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TaGT2L1A        ATGCCGCCGCCGCCGGGGCCGATGCAGCCGGCCCCTATATCTTCGGCGGCGCCTGCGCCG
TaGT2L1B        ATGCCGCCGCCGCCGGGGCCGATGCAGCCGGCCCCTATATCTTCGGCGGCCCCTGCGCCG
TaGT2L1D        ATGCCGCCGCCGCCGGGGCCGATGCAGCCGGCCCCTATATCTTCGGCCGCCCCTGCGCCG
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TaGT2L1A        GCCGTGGAGCCTCCCCAGCCGCCGCCTGTCAGCCTGCAAGGTCTGAGCTTCCCGTGCATG
TaGT2L1B        GTCGTGGAGCCTCCCCATCCGCTGCCTGTCAGCCTGCAAGGCCTCAGCTTCCCGTCCATG
TaGT2L1D        GCCGTGGAGCCTCCCCAGCCGCCGCCTGTCAGCCTGCAAGGCTTGAGCTTCCCGTCCATG
                * *************** **** ******************  * ********** ****

TaGT2L1A        TCCGACTCCGAGTCGGATGACGACGACGACTCCGAGGACGACGACATGACGGCCGAGACC
TaGT2L1B        TCCGACTCTGAGTCGGACGACGACGACGACTCCGAGGATGACGACATGACGGCCGAGACA
TaGT2L1D        TCCGACTCTGAGTCGGACGACGACGACGACTCCGAGGACGACGACATGACGGCCGAGACC
                ******** ******** ******************** ********************

TaGT2L1A        GGCGGCAGCCCGGACGGCCTCGGCAAGCGAAAGCGTGGCGGCGGGGGTAGCAAAAAGATG
TaGT2L1B        GGCGGCAGCCCGGATGGCCTCGGCAAGCGCAAGCGCGGCGGCGGCGGCAGCAAGAAGATG
TaGT2L1D        GGCGGCAGCCCGGATGGCCTCGGCAAGCGCAAGCGCGGCGGCGGCGGCAGCAAGAAGATG
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TaGT2L1A        ATGGCTTTCTTCGAGGGCCTGATGAAGCAGGTCGTACAGAGGCAGGAGGAGATGCAGCAG
TaGT2L1B        ATGGCTTTCTTCGAGGGCCTGATGAAGCAGGTCGTACAGAGGCAGGAGGAGATGCAGCAG
TaGT2L1D        ATGGCTTTCTTCGAGGGCCTGATGAAGCAGGTCGTACAGAGGCAGGAGGAGATGCAGCAG
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TaGT2L1A        CGGTTCCTGGAGACCATGGAGAAGAGGGAGGCCGAGCGCACGGCGCGGGAGGAGGCCTGG
TaGT2L1B        CGGTTCCTGGAGACCATGGAGAAGAGGGAGGCCGAGCGCACGGAGCGGGAGGAGGCCTGG
TaGT2L1D        CGGTTCCTGGAGACCATGGAGAAGAGGGAGGCCGAGCGCACGGCGCGGGAGGAGGCCTGG
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TaGT2L1A        CGCCGGCAGGAGGTGGCCCGGCTTAACCGTGAGCAGGAGCAGCTCGCCCAAGAGCGCGCC
TaGT2L1B        CGCCGGCAGGAGGTGGCCCGCCTTAACCGCGAGCAGGAGCAGCTCGCGCAGGAGCGCGCC
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TaGT2L1D      CGCCGGCAGGAGGTGGCCCGGCTTAACCGCGAGCAGGAGCAGCTCGCCCAAGAGCGCGCA
              ********************* ******** ***************** ** ********

TaGT2L1A      GCGGCAGCTTCCCGCGATGCCTCCATCATCGCCTTCCTCCAGCGCATCGGTGGGCAGGCC
TaGT2L1B      GCGGCAGCTTCCCGCGATGCCTCCATCATCGCCTTCCTCCAGCGCATCGGTGGTCAGACC
TaGT2L1D      GCGGCGGCCTCCCGCGACGCCTCCATCATCGCCTTCCTCCAGCGCATCGGTGGGCAGACC
              ***** ** ******** ********************************** *** **

TaGT2L1A      GTGCATGTCCCACCCGTCGTCATCCCCATGCCAACGCCGATGCAGGTCCAGACCTCGCCG
TaGT2L1B      GTGCATGTCCCACCCGTCGTCATCCCCATGCCAACGCCGATGCAGGTCCAGACCCCGCCA
TaGT2L1D      GTGCATGTCCCACCCGTCGTCATGCCCATGCCAACGCCGATGCAGGTCCAGACCCCGCCG
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TaGT2L1A      CCGCCAAAGAAACCTCGACAGCACCTGCCGCCACCGCCACCGTCACAGGCCACACAGCAG
TaGT2L1B      CCGCCAAAGAAACCTCGGCAGCACCTGCCGCCACCGCCGCCGTCACAGGCCACACAGCAG
TaGT2L1D      CCGCCAAAGAAACCTCGACAGCACCTCCCACCCCCGCCGCCGTCACAGGCTACACAGCAG
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TaGT2L1A      CCACAGCCGCAGCCGCAGCCTCAGCCTCAGCCCATCCCAGCTGCGCCCCTCCAACAACAA
TaGT2L1B      CCGCAGCCGCAGCCGCAGCCG------CAACCCATCCCAGCTGCGCCGCTCCAACAGCAA
TaGT2L1D      CCGCAGC------CGCAGCCT------CAGCCCATCCCAGCTGCGCCCCTCCAACAGCAA
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TaGT2L1A      CCGCC---GTCGCAACCACCACACAAGGAAACGACGCGCGAAGAGGCCGGGACGCCCCGC
TaGT2L1B      CCGCCGCCGCAACCACCGCAGCACAAGGAAACGACGCGCGAAGAGGCCGGAACGCCCCGC
TaGT2L1D      CCGCCGCCGCAACCACCGCAGCACAAGGAAACGACGCGCGAAGAGGTCGGGACGCCCCGC
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TaGT2L1A      AGCGCACCGGCCCCGACTTCTGCCGGCTTATCACTCGCGCTGGTTCCCGTCGCCACGGAG
TaGT2L1B      AGCGCACCGGCCCCGACTTCTGCCGGCTTATCACTCGCGCTGGTTCCCGTCGCCACGGAG
TaGT2L1D      AGCGCACCGGCCCCGACTTCTGCCGGCTTATCACTCGCGCTGGTTCCCGTCGCCACGGAG
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TaGT2L1A      CAGCACGTCGTCGAGGCCGCTGGTCTGGGAGGAGGGGAGAGCGTAGGGGGGCCGTCGTCG
TaGT2L1B      CAGCACGTCGTCGAGGCCGCTGGTCTGGGAGGAGGGGAGAGCGGAGGGGGGCCGTCGTCG
TaGT2L1D      CAGCACGTCGTCGAGGCCGCTGGTCTGGGAGGAGGGGAGAGCGGAGGGGGGCCGTCGTCG
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TaGT2L1A      TCACGGTGGCCCAAGACGGAGGTGCACGCGCTTATCCAGCTGCGCATGGACATGGACAAT
TaGT2L1B      TCACGGTGGCCCAAGACGGAGGTGCACGCGCTTATCCAGCTCCGCATGGACATGGACAAT
TaGT2L1D      TCACGGTGGCCCAAGACGGAGGTGCACGCGCTTATCCAGCTCCGCATGGACATGGACAAT
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TaGT2L1A      CGCTACCAGGAGAACGGACCAAAGGGCCCGCTCTGGGAGGAGATCTCCGCCGGGATGCGG
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TaGT2L1B      CGCTACCAGGAGAACGGACCAAAGGGCCCGCTGTGGGAGGAGATCTCCGCCGGGATGCGG
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TaGT2L1A      CGGCTGGGTTACAGCCGCAACTCCAAACGGTGCAAGGAGAAGTGGGAGAACATCAACAAG
TaGT2L1B      CGGCTGGGTTACAGCCGCAACTCCAAACGGTGCAAGGAGAAGTGGGAGAACATCAACAAG
TaGT2L1D      CGGCTGGGTTACAGCCGCAACTCCAAACGGTGCAAGGAGAAGTGGGAGAACATCAACAAG
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TaGT2L1A      TACTTCAAGAAGGTGAAGGAGAGCAACAAGAGGCGGCCGGAGGACTCCAAGACATGCCCG
TaGT2L1B      TACTTCAAGAAGGTGAAGGAGAGCAACAAGAGGCGGCCGGAGGACTCCAAGACATGCCCG
TaGT2L1D      TACTTCAAGAAGGTGAAGGAGAGCAACAAGAGGCGGCCGGAGGACTCCAAGACATGCCCG
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TaGT2L1A      TACTTCCACCAGCTCGAGGCCATCTACCGCAAGAAGCACAACGGCGGCGGCAGCAGCGGC
TaGT2L1B      TACTTCCACCAGCTCGAGGCCATCTACCGCAAGAAGCACAACGGCAGCGGCAGCAGCGGC
TaGT2L1D      TACTTCCACCAGCTCGAGGCCATCTACCGCAAGAAGCACAACGGCGGCGGCAGCAGCGGC
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TaGT2L1A      GCCGCGGCCAACAACGCCGTCGTGCCTGTCCCTGCCGTCGCGGAGCATCAGAACCTGAAC
TaGT2L1B      GCCGCGGCCAACAACGCCGTCGTGTCTGTCCCTGCCGTCGCGGAGCATCAGAACCTGAAC
TaGT2L1D      GCCGCGGCCAACAACGCCGTCGTGTCTGTCCCTGCCGTCGCGGAGCATCAGAACCTGAAC
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TaGT2L1A      CGGCACGAGATCGAGATCGAGGGGAAGAAGATCAACGACACCGACAAGAGGAACAACGGA
TaGT2L1B      CGGCACGAGATCGAGATCGAGGGGAAGAAGATCAACGACACCGACAAGAGGAACAACGGA
TaGT2L1D      CGGCACGAGATCGAGATCGAGGGGAAGAAGATCAACGACACCGACAAGAGGAACAACGGA
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TaGT2L1A      GGAGTCGGAGCCGCGCAGGTACCGACAAGCAACGGGCAGACAACGCCGCCGACGGCCACG
TaGT2L1B      GGAGTCGGAGCCGCGCAGGTGCCGACAAGCAACGGGCAGACAACGCCGACGACGGCCACG
TaGT2L1D      GGAGTCGGAGCCGCGCAGGTGCCGACAAGCAACGGGCAGACAACGCCGACGATGGCCACG
              ******************** *************************** *** *******

TaGT2L1A      TTCGACCTGGGTGTAAAAAAGCCAGAAGACGCTGTGAGGGAGCTGAACGAGCAGCCGCAC
TaGT2L1B      TTCGACCTGGGCGTAAAAAAGCCAGAAGACGCTGTGAGGGAGCTGAACGAGCAGCCGCAC
TaGT2L1D      TTCGACCTGGGCGTAAAAAAGCCAGAAGACGCTGTGAGGGAGCTGAACGAGCAGCCGCAC
              ************ ************************************************

TaGT2L1A      CGGGAGTTCACGACGGACGAGACCGACAGCGACGACATGGGCGATGACTACACTGACGAC
TaGT2L1B      CGGGAGTTCACGACGGACGAGACCGACAGCGACGACATGGGCGATGACTACACTGACGAC
TaGT2L1D      CGGGAGTTCACGACGGACGAGACCGACAGCGACGACATGGGCGATGACTACACTGACGAC
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TaGT2L1A        GGCGAGGACGGCGAGGACGACGGCAAAATGCAGTACAGGATACAGTTCCAGAGGCCAAAC
TaGT2L1B        GGCGAGGACGGCGAGGACGACGGCAAAATGCAGTACAGGATACAGTTCCAGAGGCCAAAC
TaGT2L1D        GGCGAGGACGGCGAGGACGACGGCAAAATGCAGTACAGGATACAGTTCCAGAGGCCAAAC
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TaGT2L1A        CCCGTCGGCACCAACAATGCGCCTCCATCACCAACCACCGCGGCGACAGCGGCGCCGACA
TaGT2L1B        CCCGTCGGCACCAACAATGCGCCTCCACCGCCAACCACCGCGGCGACAGCAGCGCCGACA
TaGT2L1D        CCGGTCGGCACCAACAATGCGCCTCCACCGCCAACCACCGCGGCGACAGCAGCGCCGACA
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TaGT2L1A        TCGACCCCCGCGAGCTCCTTTCTCGCCATGGTTCAG
TaGT2L1B        TCGACCCCCGCGAGCTCCTTCCTCGCCATGGTTCAA
TaGT2L1D        TCGACCCCCGCGAGCTCCTTCCTCGCCATGGTTCAG
                ********************* ***************
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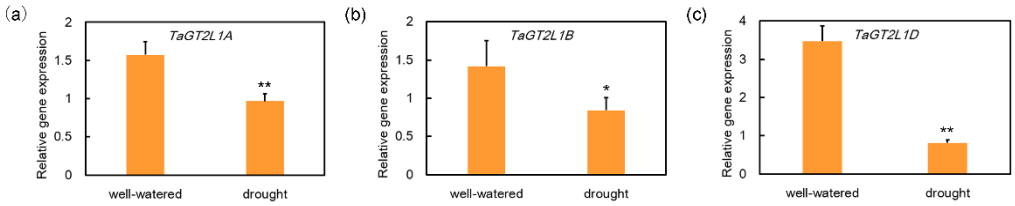
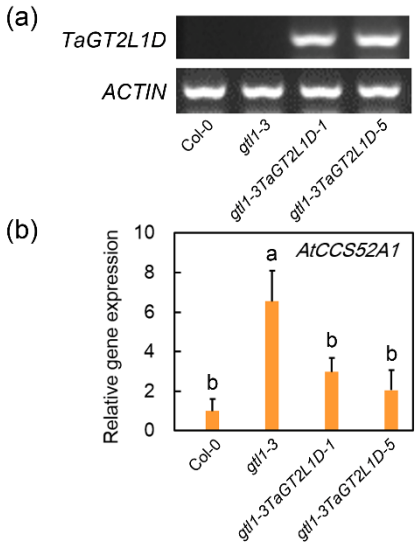
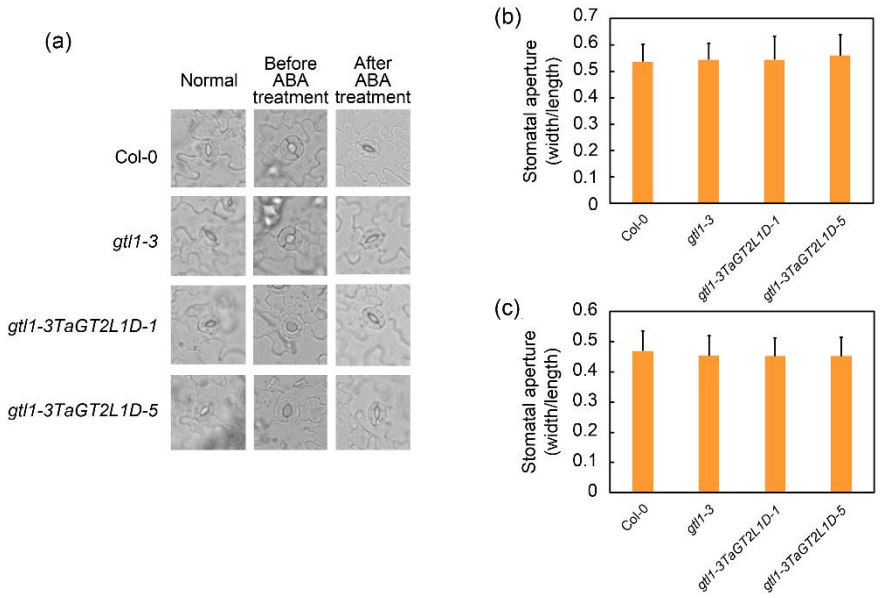
Supplementary Fig. S1 The nucleotide sequences of *TaGT2L1A*, *TaGT2L1B*, and *TaGT2L1D*. Sequences alignments were performed using Clustal Omega 1.2.1. The asterisks indicate the consensus sequences.



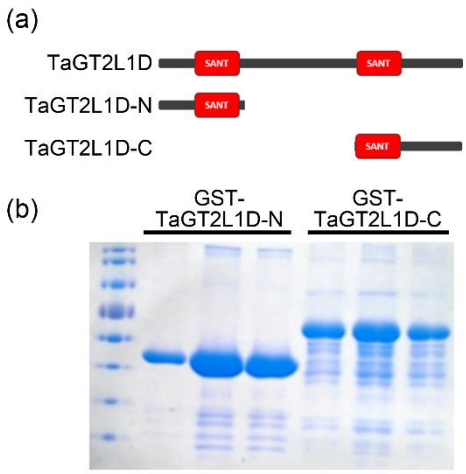
Supplementary Fig. S2 Drought treatment suppressed the expression of *TaGT2L1A*, *TaGT2L1B*, and *TaGT2L1D*. One-week-old wheat seedlings were cultured with (well-watered) or without (drought) watering for three weeks, and then total RNA was isolated from leaf samples and reverse-transcribed (n = 6). The qPCR was performed to determine the expression of *TaGT2L1A* (**a**), *TaGT2L1B* (**b**), and *TaGT2L1D* (**c**) using *TaACTIN* gene as an internal reference. All values are the means ± standard deviations of three independent experiments. Asterisks represent statistically significant differences compared with well-watered group (Student's *t*-test, *P < 0.05, **P < 0.01).



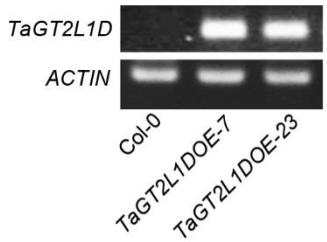
Supplementary Fig. S3 Expression levels of *TaGT2L1D* and *AtCCS52A1* in Col-0, *gtl1-3*, and gtl1-3 TaGT2L1D lines. Total RNA from six-week-old Col-0, *gtl1-3*, *gtl1-3TaGT2L1D-1*, and *gtl1-3TaGT2L1D-5* plants was isolated and reverse-transcribed (n = 6). Gene-specific primers were used to examine the expression of *TaGT2L1D* (**a**) and *AtCCS52A1* (**b**). RT-PCR and qPCR were performed using *AtACTIN* as an internal reference. All values are the means ± standard deviations of three independent experiments. Different letters indicate a significant differences (Student-Newman-Keuls test, $P < 0.05$).



Supplementary Fig. S4 Stomatal aperture in wild-type Col-0, *gtl1-3*, and *gtl1-3TaGT2L1D* lines under normal condition or ABA treatment. (**a**) Stomatal apertures in Col-0, *gtl1-3*, *gtl1-3TaGT2L1D-1*, and *gtl1-3TaGT2L1D-5* plants under normal condition or after 20 μM ABA treatment for 1 h. "Normal" indicates stomatal apertures in normal condition; "Before ABA treatment" indicates stomatal apertures after 2 h incubation in a buffer solution (20 mM KCl, 5 mM MES-KOH, and 1 mM $CaCl_2$, pH 6.15); "After ABA treatment" indicates stomatal apertures after 1 h 20 μM ABA incubation. Representative micrographs are shown. (**b**) Stomatal apertures of Col-0, *gtl1-3*, *gtl1-3TaGT2L1D-1*, and *gtl1-3TaGT2L1D-5* plants corresponding to "Normal" group in (**a**). (**c**) Stomatal apertures of Col-0, *gtl1-3*, *gtl1-3TaGT2L1D-1*, and *gtl1-3TaGT2L1D-5* plants corresponding to "After ABA treatment" group in (**a**). All values are the mean ratios of width to length ± standard deviations of three independent experiments (n = 60).



Supplementary Fig. S5 Expression and purification of GST-TaGT2L1D-N and GST-TaGT2L1D-C proteins. (**a**) Schematic diagrams of TaGT2L1D-N and TaGT2L1D-C proteins. Red boxes indicate SANT domains. (**b**) The purified proteins were separated on a 10% polyacrylamide gel, and Coomassie brilliant blue (CBB) staining was performed to show the purity of GST-TaGT2L1D-N and GST-TaGT2L1D-C proteins.



Supplementary Fig. S6 Expression level of *TaGT2L1D* in the *TaGT2L1DOE* lines. Total RNA from four-week-old Col-0, *TaGT2L1DOE-7*, and *TaGT2L1DOE-23* plants was isolated and reverse-transcribed (n = 6). RT-PCR was performed using *AtACTIN* as an internal reference.