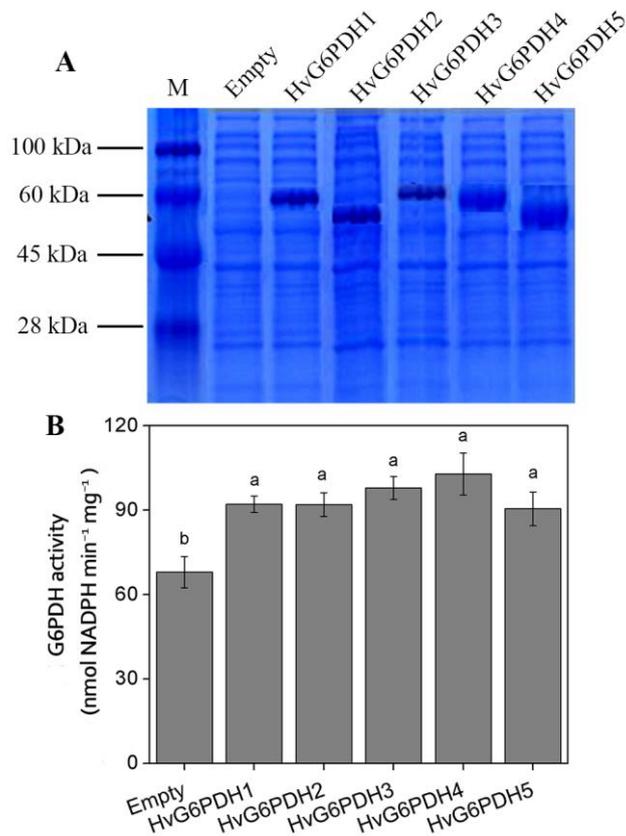


**Table S1.** Primers used in this study.

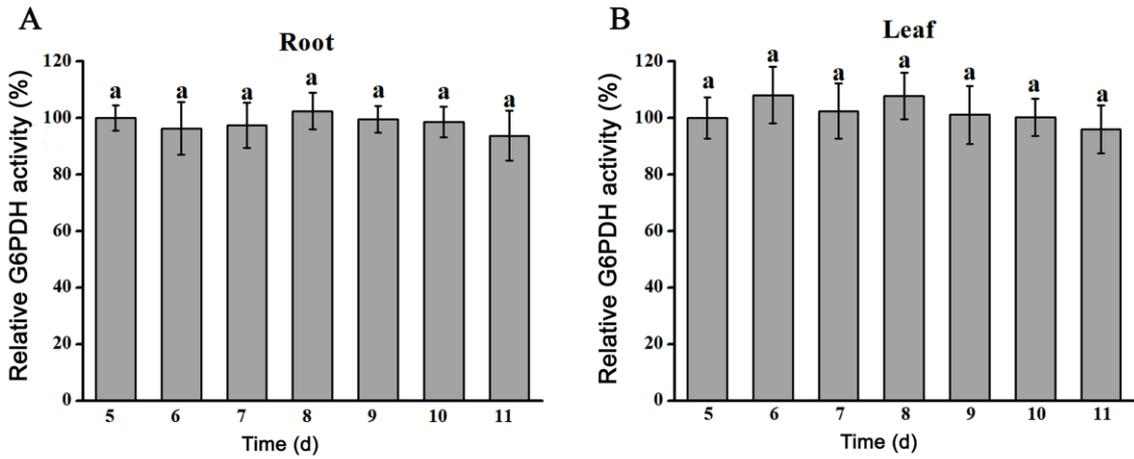
Primer name	Primer sequence (5' to 3')	Purpose
HvG6PDH1-F	CGCCACGAGACTAGAAAGAAGC	
HvG6PDH1-R	TTGGGATGGAGGGAGTAGTAGCT	
HvG6PDH2-F	CCAGCATCCCAGCAGTAACTCT-3'	
HvG6PDH2-R	CATATTAGGTCGCCTTACCGTCG-3'	
HvG6PDH3-F	AACCCCAATCCAGCACCAAAG	Full-length cDNA amplification for <i>HvG6PDHs</i>
HvG6PDH3-R	ACCAACAGCTTTTGCAGTTACAC	
HvG6PDH4-F	CACCATTTCGTCAGAGCCAAGCAT	
HvG6PDH4-R	AGTAGAGTGCATAGGCCGTAGCC	
HvG6PDH5-F	GGACGGAGAAACCATACAGAC	
HvG6PDH5-R	CTCTGTAAACCCAGAACACTC	
HvG6PDH1-P-F	CATGCCATGGCGCTCTCCTGCATGA	
HvG6PDH1-P-R	CCGCTCGAGGCAGCCATCATCCCATCGGA	
HvG6PDH2-P-F	CATGCCATGGCGGGAAGTACTCCTC	
HvG6PDH2-P-R	CCGCTCGAGTGCAAGGGTGGTGGTATCC	
HvG6PDH3-P-F	CATGCCATGGCGCTCTCCTGCATGA	Link of <i>HvG6PDHs</i> CDS and PET28(a)
HvG6PDH3-P-R	CCGCTCGAGGTGTTCTGATCCTCCTAGGT	
HvG6PDH4-P-F	GGGAATTCCATATGATGGCGCTCTCCTGCATG A	
HvG6PDH4-P-R	ACGCGTCGAC CAAGGATCCGTCGCTGCTGAT	
HvG6PDH5-P-F	CGGATCCATGTCAGGAGGATCGGGTGT	
HvG6PDH5-P-R	CCGCTCGAGAACTTCGCAAGGGTGGTG	
HvG6PDH1-L-F	CACCATGGTTACGACAGTCCTCGC	
HvG6PDH1-L-R	GCATCCATCATCCATCTGACT	
HvG6PDH2-L-F	CACCATGGCGGGAAGTACTCCTC	
HvG6PDH2-L-R	TGCAAGTGTGGTGGTATCCAGA	Localization for <i>HvG6PDHs</i>
HvG6PDH3-L-F	CACCATGGCGCTCTCCTGCATGA	
HvG6PDH3-L-R	GTGTTCCGATCCTCCCAGGT	
HvG6PDH4-L-F	CACCATGGCCGCCATCGACTTA	
HvG6PDH4-L-R	CAAGGATCCGTCGCTGCTGATGT	

HvG6PDH5-L-F	CACCATGTCAGGAGGATCGGGT	
HvG6PDH5-L-R	AAACTTCGCAAGGGTTGGTG	
HvG6PDH1-R-F	TGAAACGGCAAATACAAGCTCT	
HvG6PDH1-R-R	ACTTTACTTCTTGCCAGTT	
HvG6PDH2-R-F	GAACCCGATAAAGGACGAAGA	
HvG6PDH2-R-R	TCTTGAGTTTAATGCTTTACC	
HvG6PDH3-R-F	AGCTACGGTATTATCCGAGACAT	Real-time PCR for <i>HvG6PDHs</i>
HvG6PDH3-R-R	ATGTAATACCACCCTTCGT	
HvG6PDH4-R-F	GTCCAATCCAAGCACCAAAC	
HvG6PDH4-R-R	TGATGCTGACGGTGTCCCT	
HvG6PDH5-R-F	GTTGTACTAGGTGCTTCTGG	
HvG6PDH5-R-R	ACAATCTGTACGTTATCAA	
HvACTIN-F	GTGGTCGTACAACAGGTATT	Real-time PCR for <i>HvACTIN</i>
HvACTIN-R	TCTGTCAGGATCTTCATT	

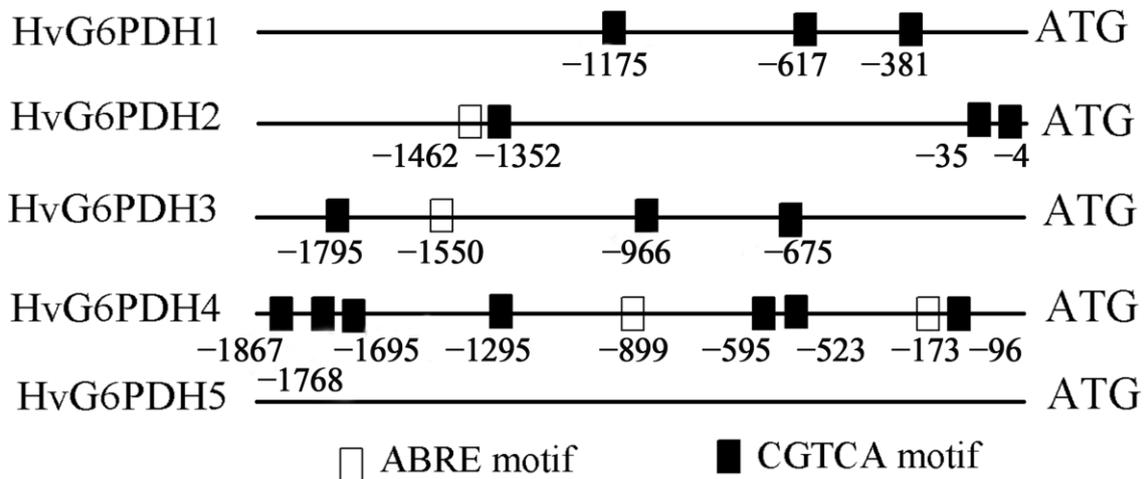


**Figure S1.** Expression of the five *HvG6PDH* genes and their enzyme activity in *E. coli*. **(A)** SDS-PAGE profile of protein extracts from IPTG-induced *E. coli*. The arrowheads showed the bands of *HvG6PDH* proteins. **(B)** The enzyme activity of G6PDH proteins in *E. coli*. The *E. coli* was transformed with pET28(a) empty and pET28(a)-*HvG6PDHs* (*HvG6PDH1* to 5) vectors, respectively. Statistical

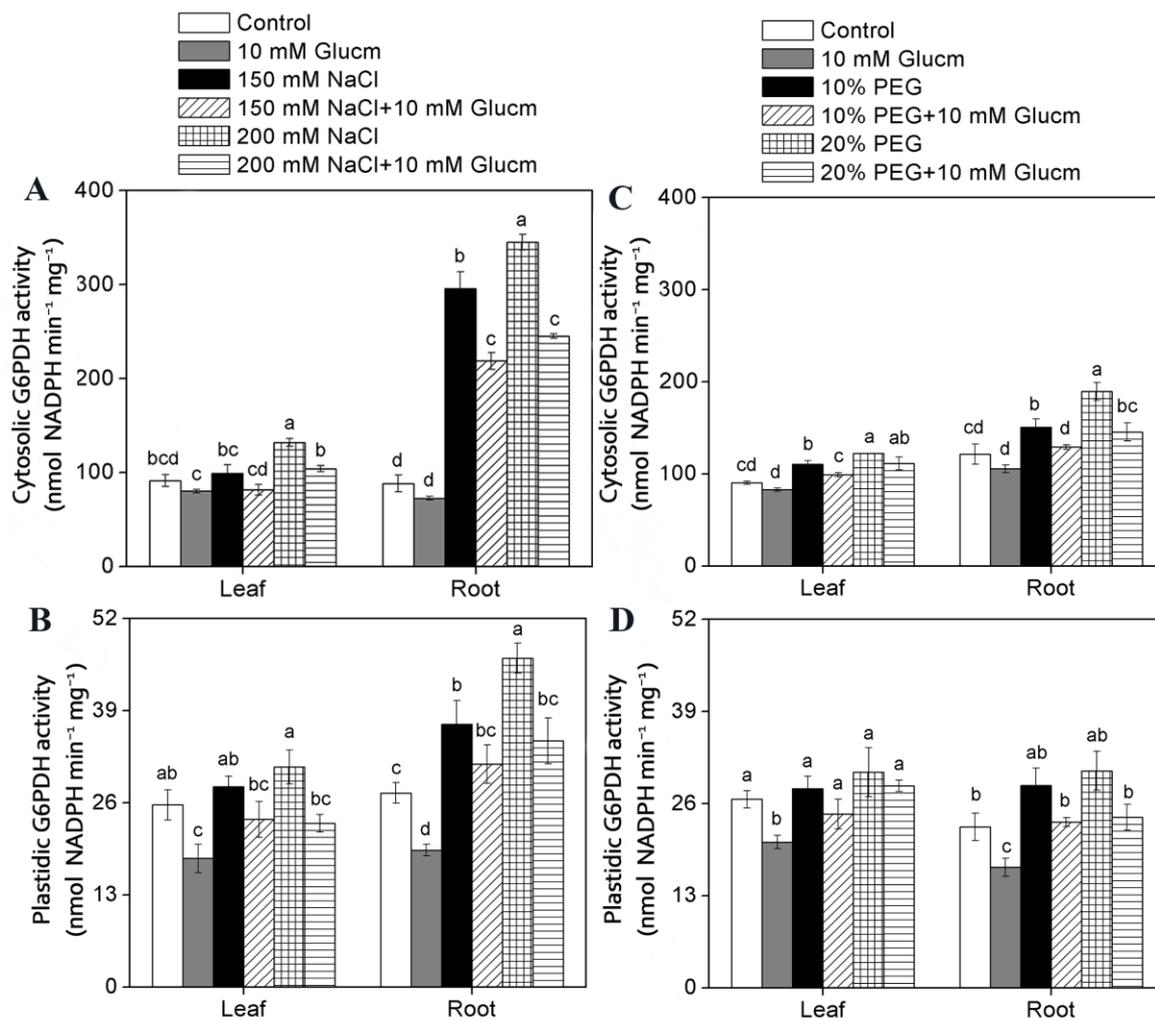
differences were analyzed on the basis of the Student's t-test, and bars with different letters were different at the 0.05 level.



**Figure S2.** The analysis of total G6PDH activity in the leaves (A) and roots (B) of highland barley seedlings at the different growth stages. The highland barley seedlings were cultured in the 1/4-strength Hoagland media. Statistical differences between the G6PDH activity of 5-days-old seedlings and G6PDH activity at other time point were analyzed on the basis of Student's t-test, and bars with different letters were different at the 0.05 level.



**Figure S3.** ABRE (white box) and CGTCA (black box) motifs in the promoter sequences (2000 bp) before initiation codon ATG of *HvG6PDH1-5* genes. ABRE and CGTCA motifs indicated the ABA and JA response elements, respectively. These motifs were predicted by online software plantCARE (<http://bioinformatics.psb.ugent.be/webtools/plantcare/html/>).



**Figure S4.** Effect of G6PDH inhibitor (Glucm) on the activities of cytosolic and plastidic G6PDH in leaf and root under NaCl (A,B) and PEG (C,D) stresses for 48 h from highland barley. Data are mean  $\pm$  SE (n = 3). Statistical differences were analyzed on the basis of Student's t-test, and bars with different letters were different at the 0.05 level.