

Supplementary Material

Upregulation of *TaHSP90A* transcripts enhances heat tolerance and increases grain yield in wheat under changing climate conditions

Ali Ammar^A, Zulfiqar Ali^{A,B,C,}, Muhammad Abu Bakar Saddique^A, Muhammad Habib-ur-Rahman^D, and Imtiaz Ali^E*

^AInstitute of Plant Breeding and Biotechnology, MNS University of Agriculture, Multan 6000, Pakistan.

^BDepartment of Plant Breeding & Genetics, University of Agriculture, Faisalabad 38000, Pakistan.

^CPrograms and Projects Department, Islamic Organization for Food Security, Astana 019900, Kazakhstan.

^DDepartment of Agronomy, MNS University of Agriculture, Multan 6000, Pakistan.

^ERegional Agricultural Research Institute, Bahawalpur 63100. Pakistan.

*Correspondence to: Zulfiqar Ali Programs and Projects Department, Islamic Organization for Food Security Astana, Kazakhstan Email: zulfiqar.ali@mnsuam.edu.pk; zulfiqarpbg@hotmail.com

Supplementary File:

Table S1. Parentage/Pedigree of E-01 (tolerant) and SHP-52 (sensitive) wheat genotypes.

Code	Genotype	Parentage/Pedigree	
G1	E-01	ATILA/3*BCN//BAV92/3/PASTOR/4/KIRITATI	Heat Tolerant
G2	SHP-52	MILAN/S87230//BAV92/3/AKURI#1/4/MILLAN	Heat Sensitive

Table S2. List of reagents and their quantity used in semi-qPCR

Chemical Reagent	Quantity
Template (cDNA)	1.0µl (40 ng)
Primer F (1:10)	0.5µl (2.5 mM)
Primer R (1:10)	0.5µl (2.5 mM)
Magnesium chloride (Mgcl ₂)	1.6µl (2.5 mM)
dNTP Mix 10mM	1µl (10 mM)
Buffer (10x)	2µl
Taq Polymerase 5U/µl	0.2µl (5U/L)
Water	8.2µl
Total Volume	15µl