

A novel DUF740 gene family member (OsSRDP) from rice imparts better climate resilience through multiple stress tolerance

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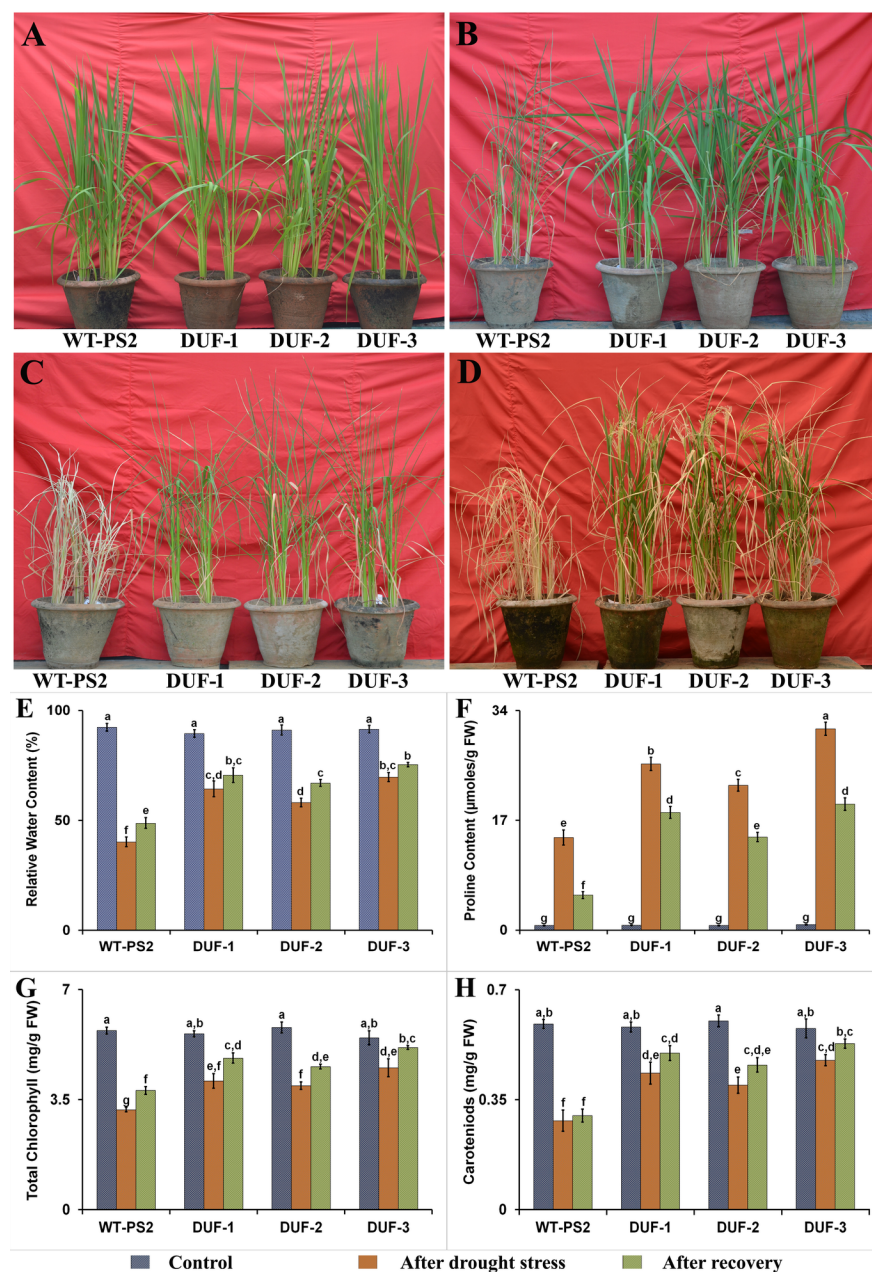
April 15, 2022

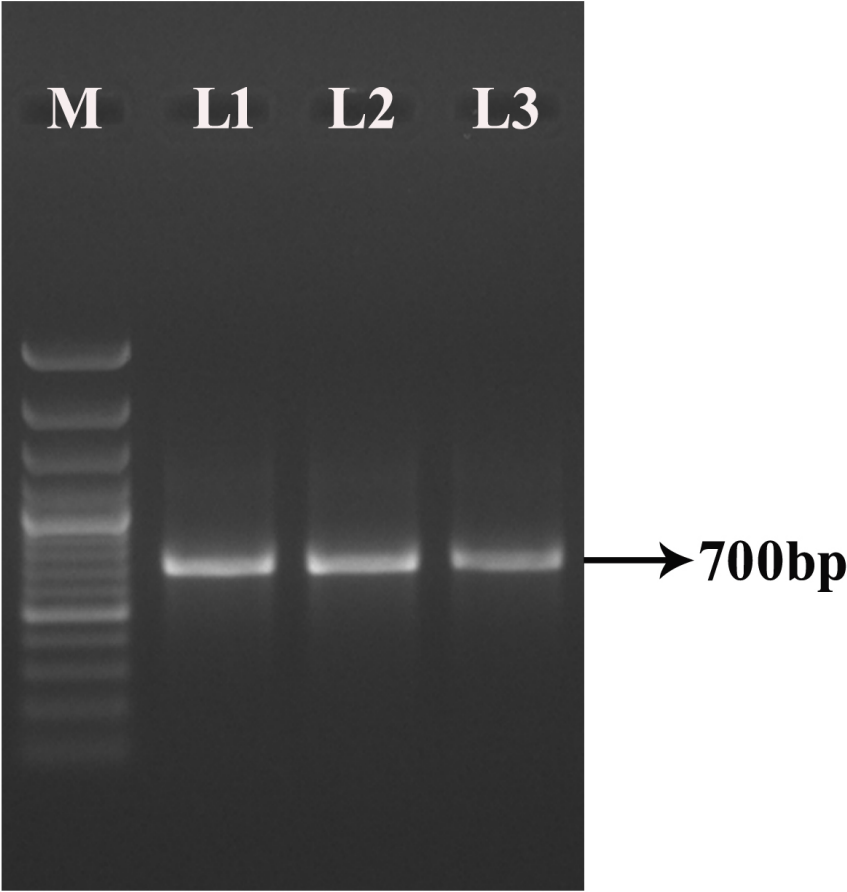
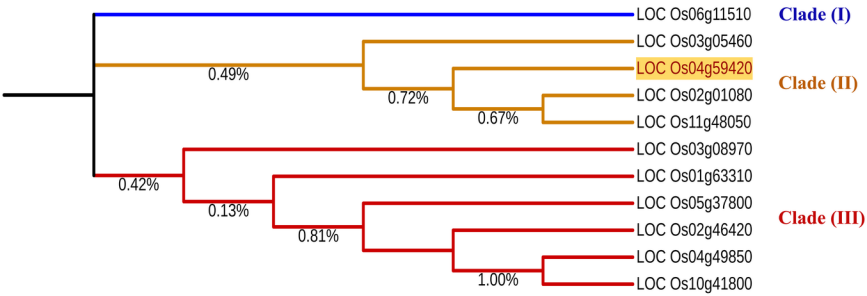
Abstract

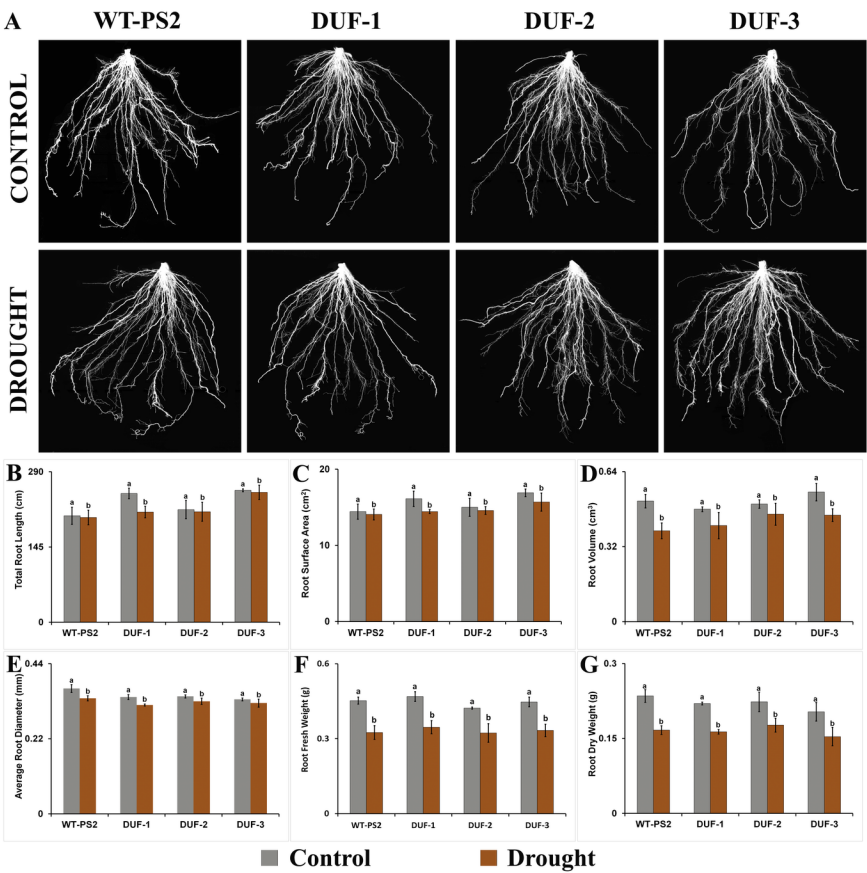
Domain of Unknown Function 740 (DUF740) is a gene family that has not been functionally elucidated in rice, until now. We investigated the function of rice DUF740 gene family member, LOC.Os04g59420 (*OsSRDP*- *O ryza s ativa* **S**tress **R**esponsive **D**UF740 **P**rotein) which showed upregulation in response to drought stress in the available global expression data. Transgenic plants of *OsSRDP* gene, driven by a stress-inducible promoter *AtRd29A*, were developed in the background of a drought stress sensitive rice cv. Pusa Sugandh 2 (PS2) and their transgene integration and copy number were confirmed by molecular analysis. Homozygous transformants showed better resilience than PS2 when subjected to drought, salinity and cold stresses but not heat stress. Transgenic plants maintained higher RWC, photosynthetic pigments and proline accumulation under drought and salinity stresses. Further, they exhibited less accumulation of reactive oxygen species (ROS) than PS2 under drought stress as seen from the transcript abundance studies of the ROS genes. Under cold stress, *OsSRDP* transgenic lines illustrated minimal cell membrane injury than PS2. Additionally, the transgenic plants showed resistance to virulent strain of rice blast fungus *Magnaporthe oryzae*. Altogether, our findings established that stress-inducible expression of *OsSRDP* can significantly enhance tolerance to multiple abiotic stresses and a biotic stress.

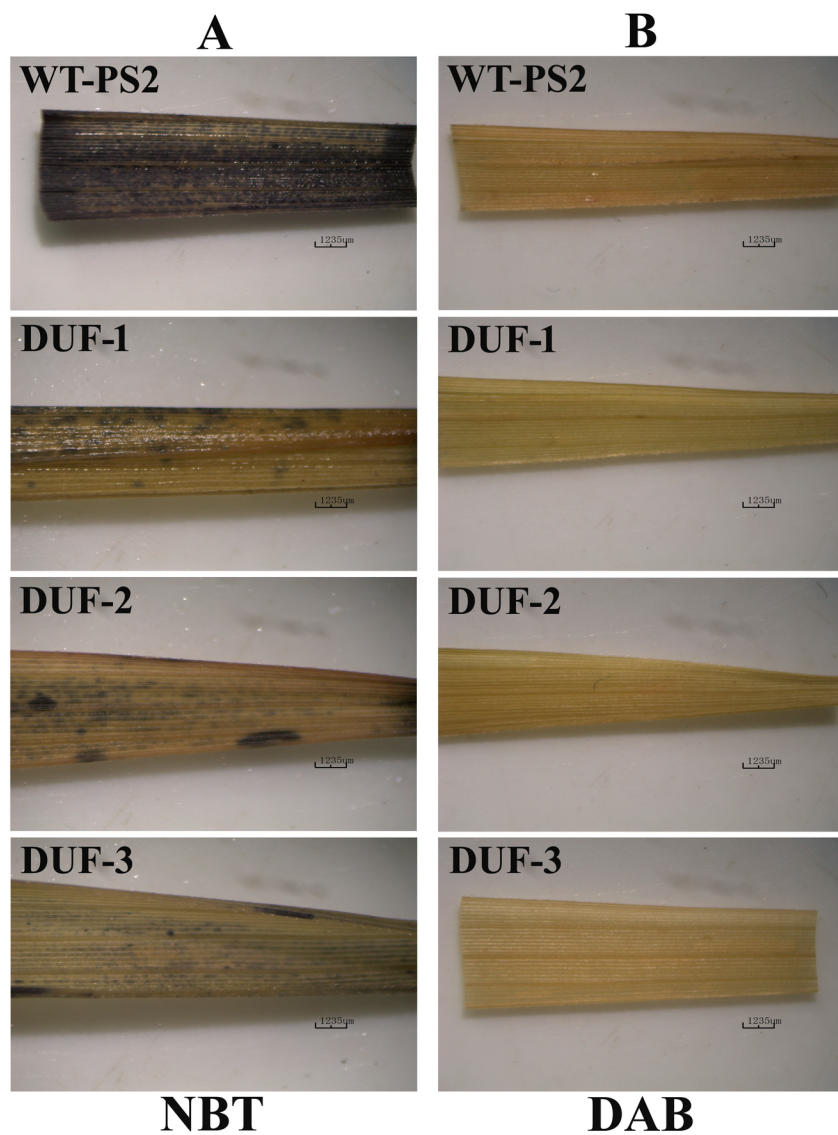
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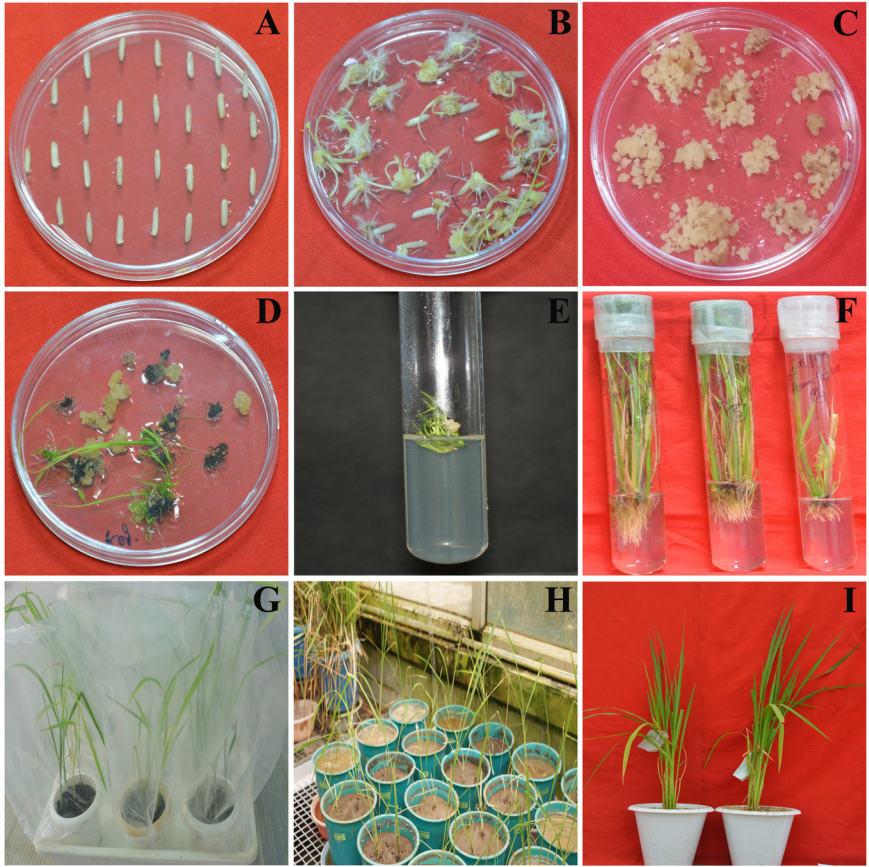
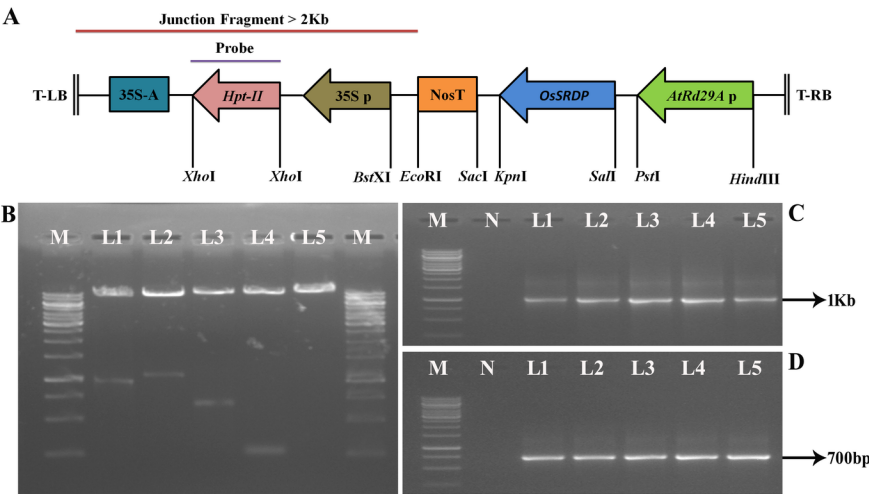
Final Version Manuscript DUF740 gene family PCE 11 4 2022.doc available at <https://authorea.com/users/476613/articles/565511-a-novel-duf740-gene-family-member-ossrdp-from-rice-imparts-better-climate-resilience-through-multiple-stress-tolerance>

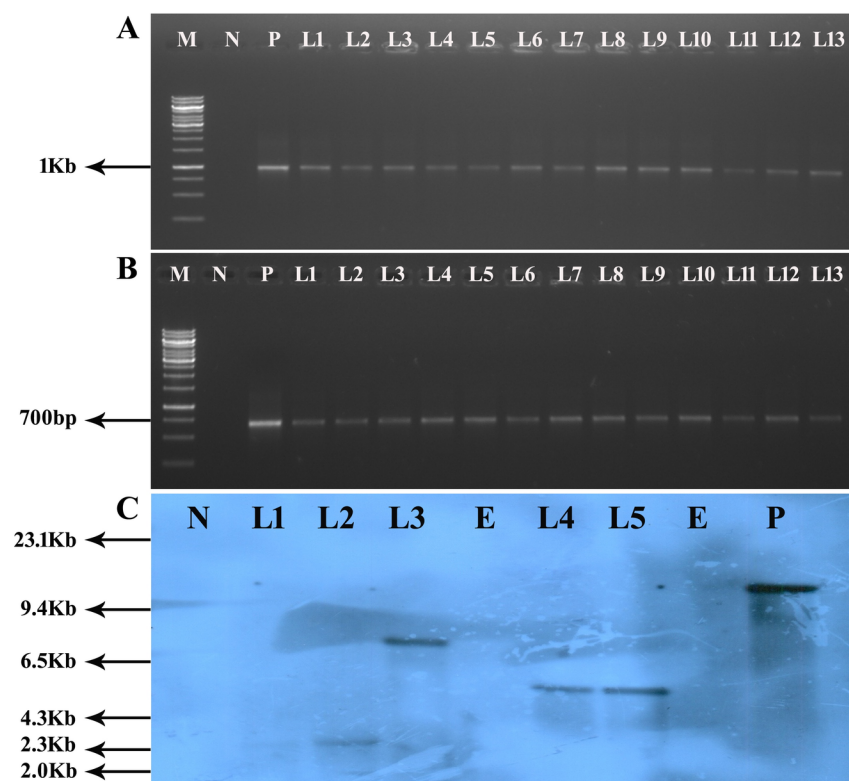
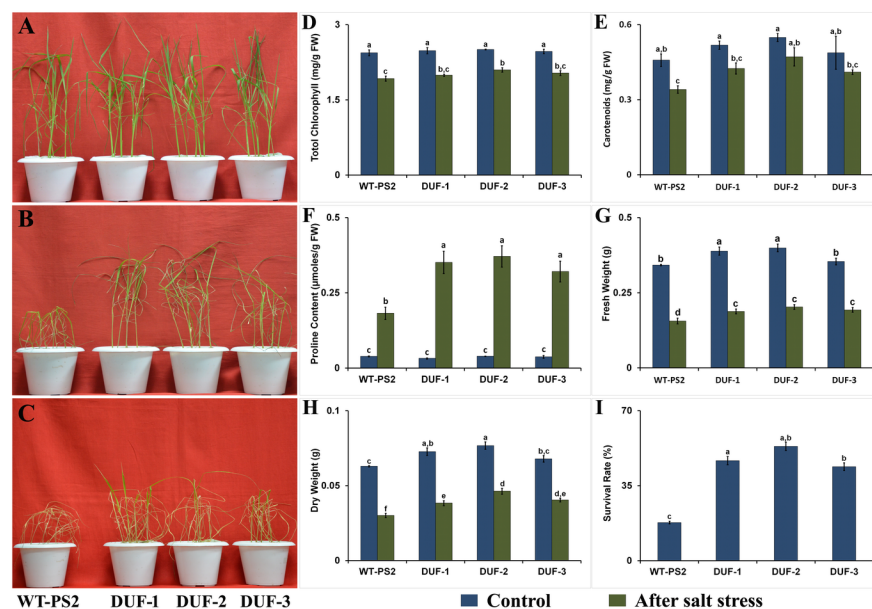


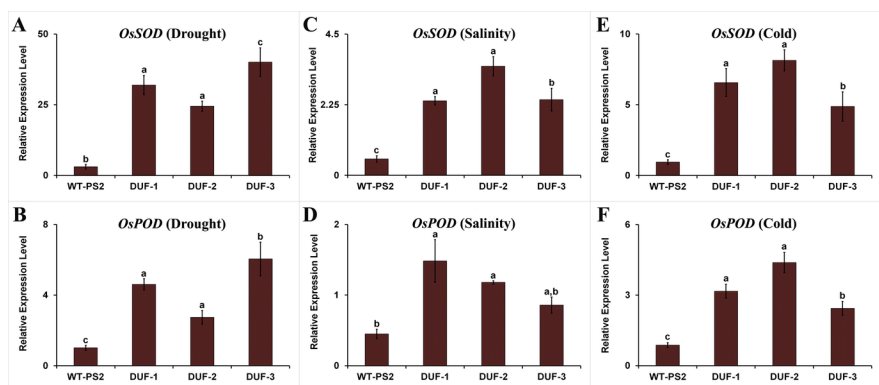
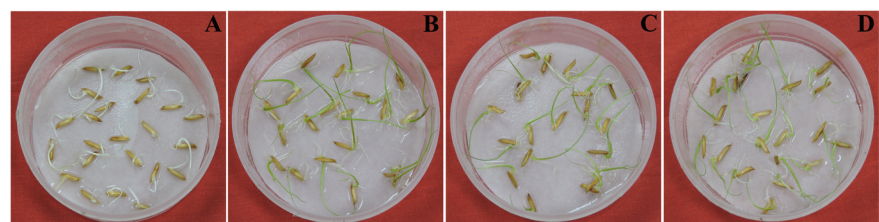
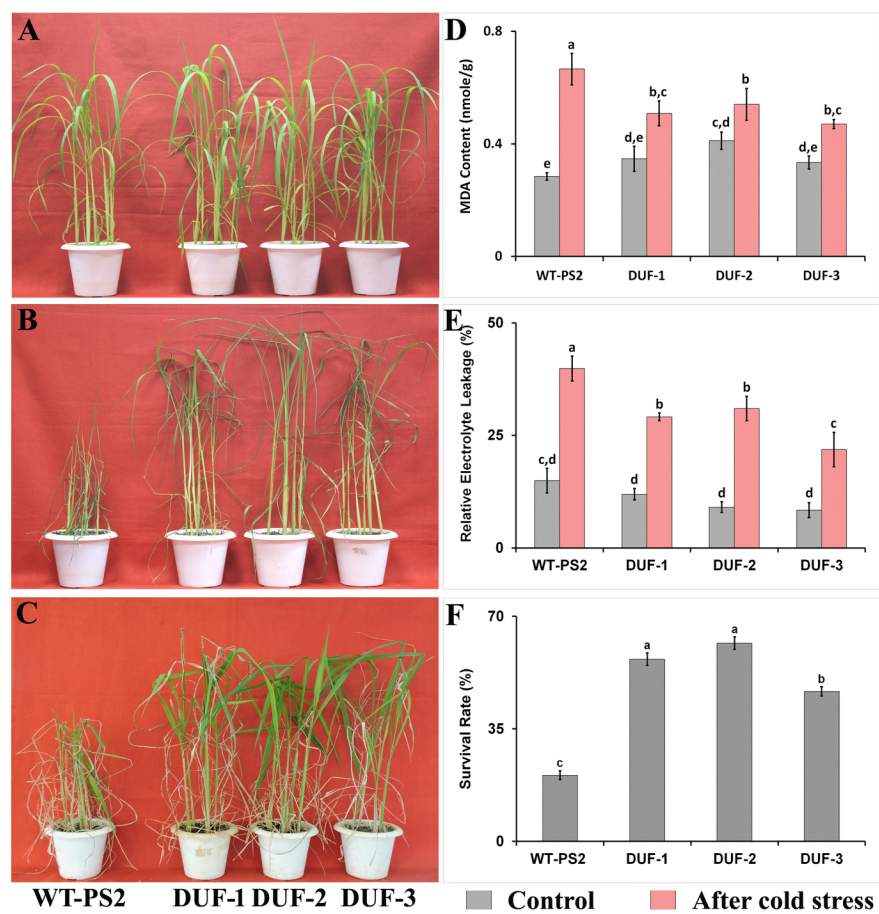


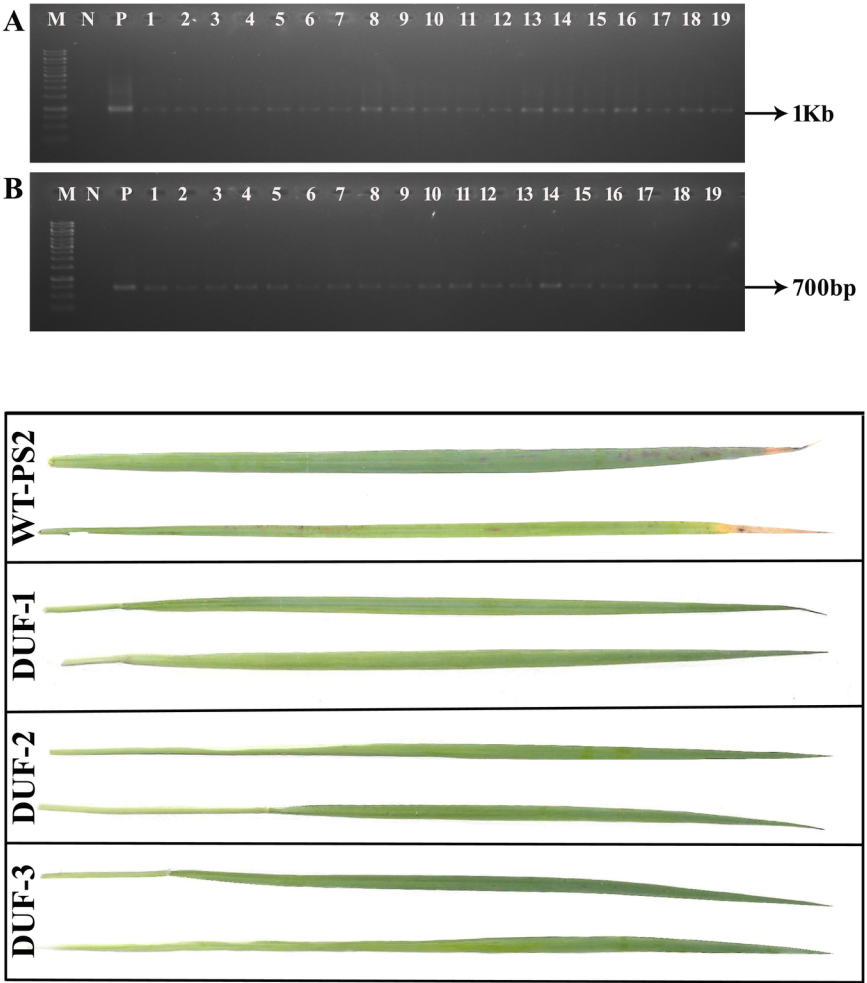












Functional Validation of *OsSRDP* - a Stress Responsive Gene from DUF740 Family

