

Overexpression of Antarctic *CBF* genes increased the stress tolerance in rice plants

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C-repeat/dehydration-responsive element binding factors (CBF/DREBs) are a family of transcription factors that play a key role in regulating freezing tolerance, binding to the DRE/CRT *cis*-acting element commonly present in stress responsive genes in plant species. As a step towards understanding the stress response of antarctic vascular plants, we have researched *CBF* genes in *Deschampsia antarctica*, the only natural grass species colonized in the Maritime Antarctic, isolated *CBF* orthologs and developed the stress tolerant transgenic crop by overexpression of *Deschampsia CBF* genes (*DaCBFs*) in rice. For example, Transgenic overexpression of *DaCBF7* in rice (*pUBI::CBF7*) resulted in a dramatic increase in tolerance to low-temperature stress, while the response high salinity or dehydration was not changed, suggesting that *DaCBF7* gene is specifically related to cold tolerance response. To describe the cold-tolerance phenotype of the transgenic rice, we compared the transcriptome response between wild type rice and transgenic rices and identified a set of genes regulated by overexpression of *DaCBFs* in response to cold stress.

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