The CaChiVI2 gene of Capsicum annuum L. confers resistance against heat stress and infection of Phytophthora capsici

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Abstract: Extreme environmental condition is a serious issue affecting crop growth and development, resulting in substantial reduction in crop yield and quality. However, chitin-binding proteins (CBP) family member CaChiVI2 plays a crucial role in eliminating the impact of adverse environmental conditions. For the first time it was discovered that CaChiVI2 (Cpane08g001237) gene of pepper (Capsicum annuum L.) had a role in resistance to heat stress and physiological processes. The full-length open-reading frame (ORF) of CaChiVI2 (606-bp, encoding 201-amino acids), was cloned into TRV2:CaChiVI2 vector for silencing. The CaChiVI2 gene carries heat shock elements (HSE, AAAAAATTTTTC) in the upstream region, and thereby showing sensitivity to heat stress at the transcriptional level. The silencing effect of CaChiVI2 in pepper resulted in increased susceptibility to heat and Phytophthora capsici infection. It was evident from the severe symptoms on leaves, the increase in O₂ and H₂O₂ accumulation, higher malondialdehyde (MDA), relative electrolyte leakage (REL) and lower proline contents compared with control plants. Furthermore, the transcript level of other resistance responsive genes were also altered.

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Publications:
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