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Identification, Expression Analysis of the Hsf Family, and Characterization of Class A4 in *Sedum Alfredii Hance* under Cadmium Stress

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论文题目: Identification, Expression Analysis of the Hsf Family, and Characterization of Class A4 in *Sedum Alfredii Hance* under Cadmium Stress

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论文摘要:

Sedum alfredii Hance, a cadmium (Cd)/zinc (Zn)/lead (Pb) co-hyperaccumulating species, is a promising phytoremediation candidate because it accumulates substantial amounts of heavy metal ions without showing any obvious signs of poisoning. The heat shock transcription factor (Hsf) family plays crucial roles in plant growth, development, and stress responses. Although the roles of some Hsfs in abiotic stress have been well studied in model plants, the Hsf family has not been systematically investigated in heavy metal hyperaccumulators. Here, we comprehensively analyzed the Hsf gene family in *S. alfredii* based on a transcriptome under Cd stress. There were 22 Hsf members that were identified and phylogenetically clustered into three classes, namely, SaHsfA, SaHsfB, and SaHsfC. All of the three classes shared similar motifs. The expression profiles of the 22 Hsf members showed significant differences: 18 SaHsfs were responsive to Cd stress, as were multiple SaHsp genes, including SaHsp18.1, SaHsp22, SaHsp26.5, SaHsp70, SaHsp90, and SaHsp101. Two class A4 members, SaHsfA4a and SaHsfA4c, exhibited transcriptional activation activities. Overexpression of SaHsfA4a and SaHsfA4c in transgenic yeast indicated an improved tolerance to Cd stress and Cd accumulation. Our results suggest SaHsfs play important regulatory roles in heavy metal stress responses, and provide a reference for further studies on the mechanism of heavy metal stress.

regulation by SaHsfs.

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