

# Advances in Epigenome Editing for Improving Plant Abiotic Stress Resistance

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**Abstract:** *Abiotic stresses such as drought, salinity, extreme temperatures, and heavy metal toxicity significantly limit agricultural productivity worldwide. Recent advances in epigenome editing have emerged as powerful tools for improving plant resilience without altering DNA sequences. Epigenetic mechanisms including DNA methylation, histone modification, and non-coding RNA regulation play crucial roles in modulating gene expression under stress conditions. Modern genome engineering technologies, especially CRISPR/dCas-based systems, have enabled targeted epigenetic modifications, offering new opportunities for crop improvement. This review summarizes recent advances in epigenome editing strategies, their applications in enhancing abiotic stress tolerance, and future prospects for sustainable agriculture.*

**Keywords:** Plant Stress Biology, DNA Methylation, Histone Modification