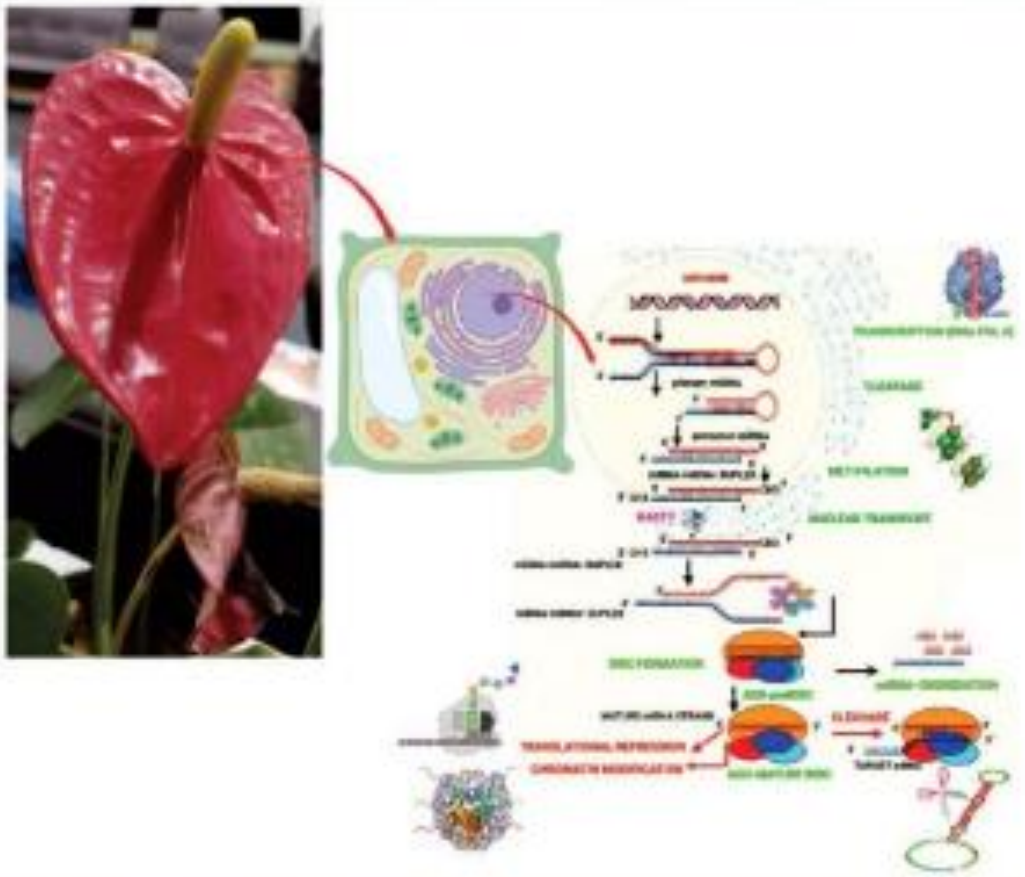
Plant MicroRNAs and Stress Response



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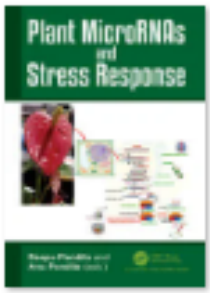

Chapter

MicroRNA-based Plant Genetic Engineering for Crop Improvement

By Heena Tabassum, Iffat Zareen Ahmad

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ABSTRACT

The main mechanism of microRNA (miRNA) is mRNA cleavage while secondary mechanism is silencing of the chromatin. An immense and important role played by miRNA in plants as well as animals via RNA interference has made people adopt several techniques in manipulation of particular genes or microRNA's in vivo from the knowledge that already exists about the antisense technology as well as genetic engineering. Recent research has found that miRNAs have a function in plant structure which adds to the understanding of molecular mechanisms that seem to be responsible for plant structure. RNA interference has greatly advanced in terms of a genetically engineered tool and functional genomics which target crop enhancement. RNA interference is also used to manage insects that cause considerable amounts of crop damage. Crop advances, which give resistance to environmental stressors and soil viruses as well as a good yield, would particularly be essential.

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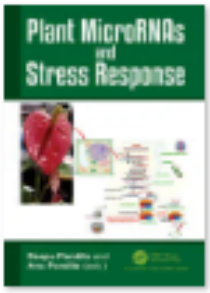

Chapter

MicroRNA-mediated Regulation of UV Radiation Stress Response

By Sonam Dwivedi, Elhan Khan, Iffat Zareen Ahmad

Book Plant MicroRNAs and Stress Response

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ABSTRACT

This chapter looks at how ultraviolet B (UV-B) stress affects microRNA (miRNA) regulation in plants. Many photochemical reactions occur in living organisms because most organic compounds absorb UV radiation readily. UV-B stress is statistically significant in the arrays of motifs in their proximal promoter regions. There are more gene ontology elements related to stress response in protein coding genes with similar patterns. Certain non-conserved miRNAs are abundantly generated in specific tissues or are significantly activated in specific situations, suggesting that non-conserved miRNAs in plants may play a physiological function in atypical environmental responses. The transcription of a group of miRNA genes, which control the degradation of their target protein coding mRNAs, can be triggered by light. The principal mechanism for UV-B induced repair is photorepair or photoreactivation. Conserved miRNAs that regulate ancestral transcription factors or physiological enzymes involved in fundamental plant growth or stress tolerance are known to have biological significance in plants.