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Special Issue Reprint

The Role of MicroRNAs in Plants

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Discovered in plants at the turn of the century, microRNAs (miRNAs) have been found to be fundamental to many aspects of plant biology. These small (20–24 nt) regulatory RNAs are derived via processing from longer imperfect double-stranded RNAs. They are then incorporated into silencing complexes, which they guide to (m)RNAs of high sequence complementarity, resulting in gene silencing outcomes, either via RNA degradation and/or translational inhibition. Some miRNAs are ancient, being present in all species of land plants and controlling fundamental processes such as phase change, organ polarity, flowering, and leaf and root development. However, there are many more miRNAs that are much less conserved and with less understood functions. This Special Issue contains seven research papers that span from understanding the function of a single miRNA family to examining how the miRNA profiles alter during abiotic stress or nutrient deficiency. The possibility of circular RNAs in plants acting as miRNA decoys to inhibit miRNA function is investigated, as was the hierarchical roles of miRNA biogenesis factors in the maintenance of phosphate homeostasis. Three reviews cover the potential of miRNAs for agronomic improvement of maize, the role of miRNA-triggered secondary small RNAs in plants, and the potential function of an ancient plant miRNA.

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