

**Evolution of plant genome architecture****2016**

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**Abstract**

We have witnessed an explosion in our understanding of the evolution and structure of plant genomes in recent years. Here, we highlight three important emergent realizations: (1) that the evolutionary history of all plant genomes contains multiple, cyclical episodes of whole-genome doubling that were followed by myriad fractionation processes; (2) that the vast majority of the variation in genome size reflects the dynamics of proliferation and loss of lineage-specific transposable elements; and (3) that various classes of small RNAs help shape genomic architecture and function. We illustrate ways in which understanding these organism-level and molecular genetic processes can be used for crop plant improvement.