

The genomes of the giants: a walk through the forest of tree genomes

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Preface: Arguably, trees are the most important plant species contributing to the direct success of the human endeavor and represent cornerstone species for the future of sustainable local agriculture due to their highly favorable balance of input (tilling requirements, water, fertilizers, pest control) to output (yields) in contrast to many other commodity crops. Trees or tree products are utilized in almost every application directly relevant to human survival. Their fruits provide key components to the human diet, their trunks and limbs serve to provide energy for heating and materials for building, their leaves provide cover and shading to the underlying earth while capturing and storing significant amounts of atmospheric carbon, and their decay products contribute to the health of the complex biological web of forest ecosystems and the biosphere.

Surprisingly, however, our understanding of the intricate relationship between the characters important to the utilization and sustainability of trees and the underlying genetic composition of these characters is still in its infancy. However, in recent years, we have experienced a substantial change in the attitudes of both public and private funding

sources coupled with advances in genomics technologies that have directly contributed to setting the stage for the unprecedented discovery of the underlying genetic nature of many important tree traits. This remarkable turn of events is now providing us with clues to the underlying organization and evolution of tree genomes, and this knowledge is driving the development of new breeding strategies to improve and sustain our fruit tree and forest tree resources.

This special issue of *Tree Genetics and Genomes* is devoted to showcasing examples of the state of our knowledge of the organization and expression of particular tree genomes that are serving as models for genetics research in their respective plant families and in other plant families as well. Our intent is to provide an overview of what resources are available; what resources are currently being produced, and how these resources are contributing to our fundamental understanding of plant biology. Perhaps Robert Frost stated our current situation best when he wrote, “The woods are lovely, dark and deep, but I have promises to keep, and miles to go before I sleep, and miles to go before I sleep.” Our work on tree genomes is just beginning, and we still have a long way to go in understanding the biological nature and importance of these very special giants; however, what we have from this very initial glimpse is certainly lovely dark and deep.

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