

Preface

At first glance, papaya might seem an unlikely crop for inclusion in the Springer Series on Plant Genomics. Although papaya has long been widely grown and consumed in the tropical world and its popularity as a mainstream fruit crop has grown in recent years, much of the temperate world still regards papaya as a relatively exotic and obscure food. On the other hand, papaya has the distinction of being the fifth angiosperm genome to be sequenced and the first transgenic crop to be characterized at the whole genome level. Why and how has papaya achieved these scientific milestones? This book reveals that story, which begins with a virus disease for which there was no natural resistance.

In the early 1990s, the Hawaiian papaya industry was threatened with collapse when the crop was found to be heavily infected by papaya ringspot virus (PRSV), for which the crop has no resistance. In one of the most widely publicized success stories of genetically modified crops (see Chap. 7 of this book), papaya was transformed and the Hawaiian industry was saved. Transgenic papaya became a kind of poster child for the safety and efficacy of genetic transformation of a consumed fruit. That popularity, in addition to several other qualities, led to papaya becoming a focus for genomic research. Included among those other qualities are its nutritional value (one fruit provides 122 % of the U.S. Recommended Daily Allowance for vitamin A and 314 % for vitamin C); its medicinal applications (including recent findings of its potential in cancer treatment); and its small genome of 372 Mb. In the course of genetic research, it was also discovered that papaya has nascent sex chromosomes that make it a model for studying sex chromosome evolution in flowering plants. In short, this relatively obscure plant is far more interesting and scientifically valuable than anyone might have guessed.

This book is intended to provide the most up-to-date knowledge of papaya genetics and genomics. We hope it will stimulate current and future researchers to explore papaya's fundamental biology and its nutritional and medicinal properties for further improvement of this undervalued crop.

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Urbana, IL, USA
Kaneohe, HI, USA

Ray Ming
Paul H. Moore



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Ming, R.; Moore, P.H. (Eds.)

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