

The Wild World of Sugar Genetics

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Sugarcane is a remarkable species: it exhibits a multitude of different forms, colors, and has many different uses from fuel to candy to beverages. Sugarcane is a giant perennial tropical grass closely related to corn and bamboo. As interesting as it is to look at, it is, in my opinion, even more interesting genetically. Sugarcane is a polyploid species, meaning that more than one genome is contained within the same individual. Additionally, commercial sugarcane is an interspecific cross, meaning that it has two different sugar species as parents. The parental species are *Saccharum officinarum* (the noble cane) and *Saccharum spontaneum* (the wild cane). Traditional Hawaiian sugar is a little different from commercial sugarcane in that it is a single species (*Saccharum officinarum*). Specifically, *Saccharum officinarum* is an octoploid with 80 chromosomes; this means that the noble cane contains four genomes. In comparison humans have a single genome and 46 chromosomes and commercial interspecific sugarcane can have anywhere from 112-128 chromosomes.

Hawaiian sugarcane, as a diverse collection of a “pure” species, provides an excellent opportunity to learn about the history of sugar and provide great insight worldwide diversity of the species. Currently, a collaboration between UH Manoa and the University of Florida is exploring the demographic and genetic history of Hawaiian Sugarcane using genotyping

microarrays. The goals of the project are threefold; 1) Create DNA fingerprints for Hawaiian canes to help with conservation; 2) Identify the number of times sugarcane was introduced to Hawaii; 3) Identify the relationship between Hawaiian sugarcane and the world collections that have been developed. We hope to use this information to link Hawaiian types to unique uses and unique environments.

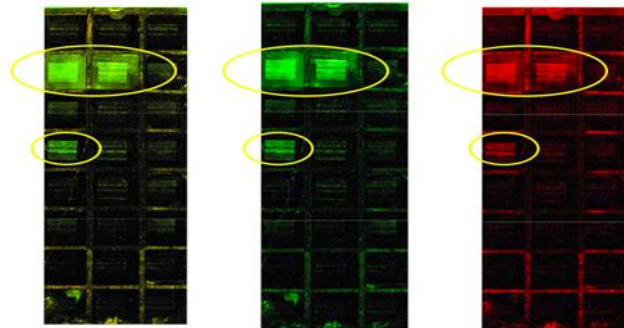


Fig 1. Example of a genotyping microarray