

DEVELOPMENT OF A DATABASE FOR MOLECULAR PROFILE MANAGEMENT OF COMMERCIAL CULTIVARS, PARENTS AND WILD ACCESSIONS OF SUGARCANE

Luciana Rossini Pinto

Agronomic Institute of Campinas (IAC)

FAPESP Process 2013/22500-5 | Term: Mar 2014 to Feb 2016

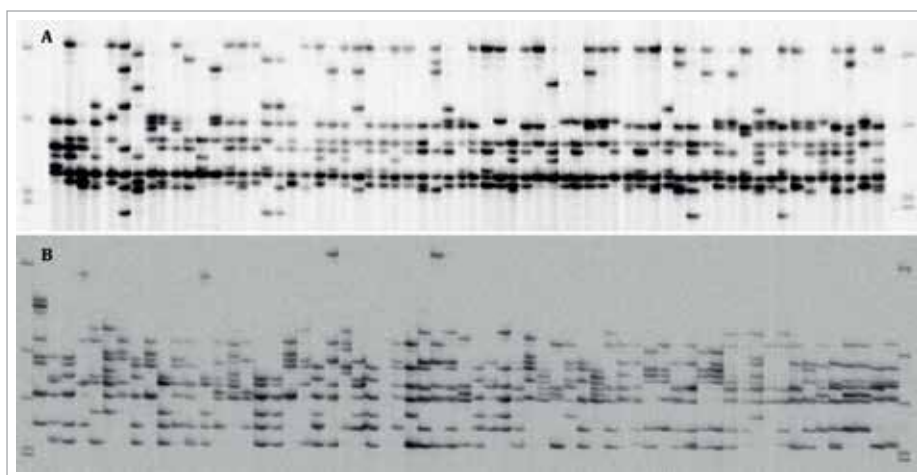
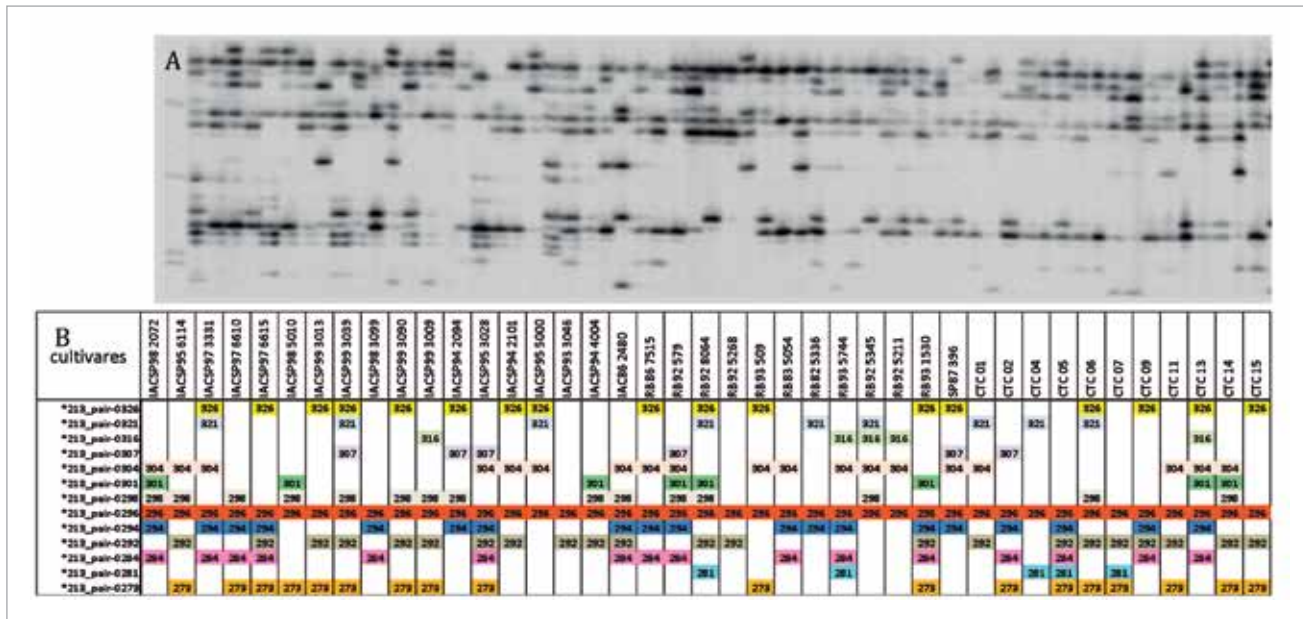


Figure 1. Molecular profile obtained by using SSRs genotyped at the 4300 DNA Analyser (LiCor) System. A: Sugarcane elite clones from the IAC Active Germplasm Bank. B: *Saccharum officinarum* clones

The efficient management and utilization of the germplasm of a breeding program is critical to the development of new cultivars. In Brazil, the sugarcane breeding programs have used molecular markers to characterize the molecular profile of their genotypes. However, there is a lack of a consolidated bank with the molecular profile of cultivars, elite clones and

wild accessions. This project has as main objective start the construction of a molecular profile database of sugarcane cultivars, wild accessions and elite clones used as parents in crosses. In addition, we intend to create a database of genomic DNA of these genotypes; identify a set of SSR primer pairs with high discriminatory power; estimate the genetic variability within and between the groups assessed and develop SCAR markers (Sequence Characterized Amplified Regions) derived from AFLP (Amplified Fragment Length Polymorphism) species-specific to *S. spontaneum*. The development of SCAR markers will allow the rapid identification of hybrids derived from crosses between sugarcane commercial cultivars and accessions of *S. spontaneum* assisting the Genetic Introgression Bioenergy Programs. We emphasize that, to our knowledge, until the present moment, in the case of public sugarcane breeding programs, in Brazil does not exist, a molecular profile database of such nature to sugarcane.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES



The molecular profile based on microsatellite markers of the sugarcane cultivars and elite clones have already been established. In addition, the molecular profile of the majority of the accessions from the *Saccharum* species (*S. officinarum*, *S. spontaneum*, *S. barberi*, *S. robustum*) and related genera (*Erianthus* and *Miscanthus*) which compose the IAC Sugarcane Germplasm Collection is near to be completed. All these molecular profiles are being deposited in a molecular profile data bank which will be used in the management of the germplasm collection and also in a genetic diversity study to define a core collection that can be used for association mapping and breeding purposes. The SSR primer set showed high PIC values (0.734 up to 0.926) and was suitable either to establish the molecular profiles or capture the genetic variability assessed through SSRs. Initial analysis conducted for each genotype category, i.e., varieties and elite clones, revealed a high degree of average genetic diversity, respectively, 0.887 and 0.860. Only 3.22% of the total SSR alleles were common among the variety category. Some alleles were variety exclusive (private), showing potential application for variety identification. In general, the dendrograms were in agreement with the pedigree information. In relation to the SCARs development, a preliminary screening for species-specific AFLP markers at the *Saccharum* Complex was conducted by using AFLP markers. This search allowed the identification of candidate species-specific and genera-specific AFLP derived markers. These candidate markers are being cloned and sequenced and will be validated to be used as SCARs.

Figure 2. A: Molecular profile of some sugarcane cultivars from different Brazilian sugarcane breeding programs obtained by using SSRs genotyped at the 4300 DNA Analyser (LiCor). B: Example of a graphic representation of the cultivars based on their allele types and sizes represented by different colors, stored at the allele panel of the Molecular Profile Data Bank

Luciana Rossini Pinto

Instituto Agronômico de Campinas, Centro de Cana
Rodovia Antonio Duarte Nogueira, km 321 (Anel
Viário Contorno Sul), Caixa Postal 206
CEP 14001-970 - Ribeirão Preto, SP - Brasil

+55-16-3919-9920
lurossini@iac.sp.gov.br