W077: Mosaic Genome Structure and Chromosome Segregation in Polyploid Interspecific Plantain Bananas and Derived Breeding Accessions

Tuesday, January 16, 2018
10:30 AM - 10:50 AM
Pacific Salon 6-7 (2nd Floor)

Almost 40% of the world banana production relies on triploid interspecific cultivars deriving from hybridization between *Musa. acuminata* (Genome A, 2n=22) and *M. balbisiana* (Genome B, 2n=22). These cultivars were classified based on morphological characteristics in genomic groups (AAB and ABB) subdivided into various subgroups. They include the cooking banana Plantain group (classified as AAB) that represents 18% of the banana production worldwide. The origin of these cultivars, their chromosome structure as well as its impact on chromosome recombination and segregation are still poorly known.

We analyzed using Genotyping By Sequencing (GBS), the A/B chromosomes composition of a few cultivars and showed that it deviates in several regions from the conventional genomic classification. For example Plantain, classified as 'AAB,' has six genomic regions with an AAA chromosome composition and one entire chromosome set with an ABB composition. We compared the global chromosome structure of A and B genomes through the construction a high density SNP genetic map of *M. balbisiana* and its comparison with the *M. acuminata* reference sequence assembly. We identified a large reciprocal translocation between chromosome 1 and chromosome 3 and a large inversion on chromosome 5. We analyzed the A/B chromosomes recombination and segregation in a progeny from an 'AAAB' Plantain-derived tetraploid breeding accession. This revealed frequent recombination between A and B chromosomes all along the genome to the main exception of the inverted segment on chromosome 5. We observed 62% of aneuploids in the progeny that mainly involved the three chromosomes displaying large structural variations between A and B genomes. Implication of these results will be discussed.

Authors

Franc-Christophe Baurens
CIRAD

Guillaume Martin
CIRAD

Catherine Hervouet
CIRAD

Célestin Njembele
CARBAP

Remy Habas
CIRAD

Frederic Salmon
Cirad

Sébastien Ricci
CIRAD

Mathieu Rouard
Bioversity International

Nabila Yahiaoui
CIRAD

Angelique D'Hont
CIRAD, UMR AGAP

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